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CLEAN AIR

AND ENVIRONMENTAL PROTECTION

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CONTENTS

Editorial 103

NSCA Views

— Climate Change: UK National Programme for Carbon Dioxide Emissions 5
— Chemical Release Inventory 12
— Draft UK Strategy for Reducing Emissions of Volatile Organic Compounds 13
— Control of VOC Emissions during Petrol Storage and Distribution — Draft EC Directive 15
— Local Government Reorganisation and the Environment 17
— UK Noise Policy — Where Next? 19

NSCA News

— Local Air Quality Management 24
— Water and Waste in the South East 28
— Energy Conservation Bill 29
— Scottish Environmental Protection Agency 29

Reports

— Visibility in the UK, 1962-1990: Dr. Derek O. Lee 30
— Can Britain Afford to Waste Municipal Waste and Continue to make an Unjustified Contribution to the Greenhouse Effect? Byrom Lees 35

Update 41

Books and Reports 46

Future Events 50

Clean Air Index, Vol 22, 1992 52

Advertisers

— Butterworth-Heinemann 48
— Coalite Smokeless Fuels cvr iii

NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

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EDITORIAL

WHEN THE POLLUTER WON'T PAY

The notion of a "polluter pays principle" (PPP) appeals. It has always had the ring of elementary justice about it. Those who create pollution should pay to clear it up; but how much should they pay? What happens if the polluter can't pay, or won't pay? And what if we can't identify the polluter? Moreover can we be sure that the justice is not too rough and that it has the desired effect?

The Government is committed to the PPP, and favours economic instruments as the means of delivering environmental policy. However the process of valuing environmental liabilities and clean-up costs is a complicated one; witness the recent fiasco over registers of contaminative uses of land. Fears of future responsibility for historical contamination put paid to a measure which could have proved a useful tool in identifying land which *might* have been contaminated.

As energy users we are all polluters, but how do we assess the risk of global warming or cost the implications of acid deposition? How should we itemise and address the bill? The Government places great emphasis on the rational pricing of energy to create the market conditions for the cost-effective investments in energy efficiency which undoubtedly exist. The recent budget signalled a long-term rise in the real price of energy. The intent is welcome, but like the market it contains some glaring imperfections.

The imposition of VAT on domestic energy will not in itself have the desired impact on energy use — those with low incomes have already cut their energy use to the bone (often with dire consequences) and are least able to invest in energy saving. The more affluent and profligate energy users are unlikely to change their habits. Unless the tax can be recycled into projects which produce real reductions in home energy use, we shall simply be paying more money for the same amount of energy, with no benefit for the community, the economy, or the environment.

Similarly the promise of further real rises in petrol and diesel prices may not be enough to trigger a real change in driving patterns and "downsizing" in the car market — at least not as long as car engine size is equated with employment status, and the bulk of car miles driven are underwritten to some extent by employers.

NSCA is discussing the relevance of economic instruments to environmental protection with a number of interested parties. In principle EIs can be targeted with some precision, offering useful and sophisticated outcomes without the need for unwieldy regulation. In practice, they may become an alternative, but equally blunt, policy instrument.

The recent budget may have marked an early attempt to bring the polluter pays principle into the Treasury, but there is clearly a long way to go before the environment sits at the heart of our economic policy. In particular policy makers will have to accept that they need to know just as much about the economic affairs of their targets to wield an effective economic instrument as they do to make a regulation stick.

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NSCA VIEWS

CLIMATE CHANGE UK NATIONAL PROGRAMME FOR CARBON DIOXIDE EMISSIONS

Comments by NSCA on Department of Environment Discussion Document published December 1992

INTRODUCTION

1. NSCA welcomed the opportunity to comment on Government proposals for a national programme for reduction in carbon dioxide emissions, and we look forward to comparable discussion documents on other greenhouse gases not controlled by the Montreal Protocol.

2. We agree with the format proposed for the programme in Chapter 9 of the discussion document, that is that it should have three basic components:

- the central projection of emissions (and the range of uncertainty associated with this projection)
- the measures that will be taken to reduce emissions
- the estimated effect these will have on projected emissions.

In addition NSCA considers that the central growth/lower energy price scenario from Energy Paper 59 provides a sensible basis for discussion. However the national programme which emerges as a result of the present consultation should provide more detail on contingencies and particularly how to respond to a high growth low price scenario. Clear targets and consensus on the means of securing them within each of the possible scenarios would enable the public and private sectors to plan ahead with confidence.

3. When the definitive national programme is published it will be important for Ministers, principally in Treasury, DoE and DTI, to confirm that policies are in place to secure the agreed reductions, to explain the targets for renewal of capital or other structural change which are implicit in these reductions and to outline arrangements for monitoring progress. Data relevant to the national programme should be published in less aggregated form so that measures can be tuned to specific circumstances. Devolution of responsibility also will be important to this end.

4. We share Government's view that voluntary action and market mechanisms are to be preferred as means of achieving energy efficiency. Thus we support the hierarchy of preference which is implicit in the discussion document namely:

- **information:** motivating adoption of cost effective options for energy saving and reduction in carbon dioxide emissions by providing facts and promoting understanding

in preference to:

- **incentives:** making initiatives which are in the common good attractive to those who can implement them

in preference to:

- **regulation:** eliminating the options which are not in the common interest.

5. That said we believe that there are serious failures in the present market for energy and energy efficient products and services. We are concerned that unless Government intervenes more than the discussion document suggests opportunities for energy saving and reduction in carbon dioxide emissions will be exploited more slowly than desirable. In consequence potential gains to the wider environment and the economy would be lost, our international standing would be diminished and we would not secure improved welfare for a significant proportion of our population. It follows that we find the proposition in para 9.4 of the discussion document that programmes should maximise the potential for savings to be achieved without Government intervention inadequate.

6. Government should lead vigorously and adjudicate the debate underlying the second and third broad elements of the national programme — the measures to reduce emissions and their effectiveness.

7. Wherever it appears that cost effective options for energy saving and reduction in carbon dioxide emissions are not being exploited fully and promptly there should be investigation to establish whether the shortfall of actual on ideal is for reasons in one or more of the following broad areas:

- **ignorance:** people have poor awareness of options and benefits.
- **consequential:** it is perceived that the inconvenience or other disbenefit of an option may outweigh its direct benefits.
- **financial:** people cannot afford the outlay on an option irrespective of its long term benefits.
- **misconception:** The option is inappropriate to individual circumstances or does not have regard to the full lifecycle implications of the product or service concerned.

8. The general principles above have guided our comments on the contents of the discussion document. We have grouped our comments by sector but give discussion document references to facilitate cross referencing. We have not commented quantitatively on the figures adopted in the discussion document because we did not have access to the models and assumptions used. Those contributing to the further development of the national programme should have access so that they can test the implications of their recommendations and consider the validity of assumptions.

ENERGY USE IN THE HOME

Information

9. There is no shortage of information which could assist the 21 million households in the UK to improve energy efficiency. The problem is to get appropriate and objective information, pitched at the right level to individuals at the right time. The Society has provided information to improve energy and environmental awareness in schools and among adults. We are reviewing our approach so that we can contribute more in future. We believe however that many individuals find it difficult to respond to generic information. Advice must be tailored to individual circumstances and impartial. The new advice centres (EACs, paras 4.6, 8.7) should be used to provide a focus for official, voluntary sector and commercial information.

10. It will be particularly important for EACs to provide independent advice on fuel choice since the statutory codes of practice do not give a comprehensive picture at present.

11. Utility regulators should agree levels of support for EACs but government should take the lead in securing support from other providers of energy services with the aim of allowing a much clearer distinction between provision of information and supply of services and equipment.

Building Regulations

12. Building regulations should be reviewed regularly in order to speed the adoption of best practice and close the gap between standards of thermal efficiency in UK housing and other northern European countries.

Upgrading the Housing Stock

13. Only a small proportion of UK dwellings conform with the thermal efficiency standards of the current building regulations. There is urgent need to improve awareness of the benefits of energy efficiency among owner occupiers and to improve incentives for remedial work.

14. Government should promote further rationalisation so that the UK has a national energy labelling scheme and policies which would secure audit of the entire housing stock within an agreed period.

15. The Energy Saving Trust (EST) should have an enabling role and the EACs could use label data to provide coherent advice tailored to individual need. Advice might take the form of an home energy plan recommending costed priorities for progressive upgrading of fabric, fuelling and equipment. Plans should be set out in a form which could be transferred easily on change of occupancy or ownership. Plans should also facilitate access to financial assistance through the Home Energy Efficiency Scheme (HEES), minor works assistance or other schemes although of course they should not become a condition of support. The EST should identify the situations where it would be in the national interest to grant aid home energy plans.

16. Government should ensure that relevant trade associations and regulators require

quality assurance arrangements are in place for services where these do not exist already. If satisfactory arrangements cannot be secured voluntarily consideration should be given to mandatory schemes.

17. The EST should consider whether special arrangements need to be made to promote investment in energy efficiency measures for rented housing. The home energy labelling scheme proposed above should apply to rented accommodation and landlords should be required to make such information available to tenants.

Energy Efficiency Labelling for Appliances

18. We support Government's determination to introduce energy labelling (para 6.2b). If a significant proportion of the trade does not adopt a voluntary scheme for energy intensive appliances consideration should be given to mandatory arrangements. Labels should enable purchasers to compare running costs for a specified and representative standard use. Testing should be carried out independently or subject to quality assurance and independent audit.

19. EACs should promote awareness of energy efficiency as a factor in appliance choice and thus promote competition among manufacturers to secure performance above the minimum.

20. Government should consult consumer groups, welfare interests, manufacturers and electricity suppliers on "unfit for purpose" labelling. Fan heaters and bar fires might be required to carry a label "not recommended for long term use as a room heater — consult the code of practice available from your retailer or electricity supplier". A comparable label could be devised for incandescent light bulbs.

Minimum Energy Efficiency Standards for Appliances

21. We welcome Government's determination to introduce minimum energy efficiency standards and recommend that provision should be made to tighten these progressively.

Paying for Energy Efficiency in the Home

22. Implementation of the national programme is likely to require third party investment in domestic energy efficiency to remedy market failures. The EST acting in the light of the targets derived from the national programme should determine priorities, including the overall level of funding. If voluntary arrangements do not generate adequate funds to meet targets there should be statutory provision. In this connection it is especially disappointing that the recent budget made no provision for investment in energy efficiency and relied instead upon increases in the cost of fuel to promote reduction in consumption. The EST should be required to consult widely at national and local level when discharging this obligation.

Statistical Basis for Policy and Action

23. Action to secure improved energy efficiency in the home needs to be tuned precisely to circumstances. Government should ensure that sufficient quality assured information is available for this purpose.

TRANSPORT

24. One fifth of UK carbon dioxide emissions arise from road transport. Emissions from transport rose by 65 per cent between 1970 and 1990 over a period when overall emissions fell by 10 per cent; further rises are likely with emissions from road transport as the main source. Government action must focus on three areas: eliminating or reducing the length of journeys; reducing emissions from individual vehicles; improving the overall fuel efficiency of the vehicle fleet.

Journeys

25. The planning system has an important role in reducing the number and/or length of journeys; further planning policy guidance from the Department of the Environment is needed in this area, for example to limit retail developments where adequate public transport is not available. Fiscal measures such as road tolls or pricing could manage demand, but must be carefully designed to avoid inequitable social and economic impacts. The provision of free fuel and transport-related employment perks encourages unnecessary and wasteful vehicle use, and should be phased out.

26. Motorists will not be tempted out of their cars unless suitable alternatives exist. Convenient and affordable public transport, safe and attractive pedestrian and cycle routes should be given priority. Such measures would enjoy widespread public support.

Individual Vehicles

27. Fuel consumption is directly related to engine tuning. Emission standards should be checked for compliance at MOT tests, based on manufacturers' own conformity of production standards. Evidence shows that many modern pre-MOT vehicles are poorly tuned; roadside emissions monitoring should thus be expanded and targets for enforcement set.

28. Lower speed limits could have direct and indirect environmental benefits. Speed limiters for cars, already required for coaches and HGVs, would greatly enhance the effectiveness of speed limit enforcement. NSCA supports the introduction of speed limiters and urges the Department of Transport to consult on this question at an early opportunity.

The Vehicle Fleet

29. Fiscal instruments could be used to encourage "down-sizing", increase the incentive to buy more fuel efficient cars and optimise the rate of turnover of the vehicle fleet. Vehicle excise duty could be banded according to Department of Transport fuel consumption data for individual models. More radically, VED could be abolished altogether and replaced by a supplement to fuel tax. The company car tax advantages which distort the car market and diminish cost sensitivity in vehicle purchase and use should be eliminated and we welcome recent changes in this respect.

30. The recent increase in excise duty on automotive fuels, allied with a clear signal of real future increases will produce some benefit, but price elasticity suggests that very substantial increases would be necessary to make a significant impact on CO_2

emissions. Regulatory action is therefore necessary to maximise the benefits which are undoubtedly achievable through improved engine and vehicle design. The inability of the European Commission, EC member states and the Motor Vehicles Expert Group to arrive at a common position on this matter is a cause for deep regret.

MAJOR ENERGY USERS IN INDUSTRY

31. We support the approach advocated in para 5.11 of the discussion document of high level commitment to energy saving. Large energy users in industry usually have the technical competence to set demanding yet realistic targets, monitor progress, and institute change where targets are not being achieved. Energy efficiency programmes in the energy intensive industries involve judgement over the full lifecycle of major plant. Clarity and stability of policy is therefore a major motivating factor, and Government should do everything it can to provide this.

32. In authorisations for processes prescribed under the *Environmental Protection Act*, greater emphasis should be placed on energy efficiency as a factor for reducing environmental impact. The resultant technology forcing should improve the competitiveness of UK industry.

33. New technologies which improve the efficiency of energy intensive industries would have a major effect upon carbon dioxide emissions. Government should consider ways of improving support for innovation in this area.

34. Wider use of combined heat and power (CHP) could improve the efficiency of the energy intensive industries. To this end, we support the proposals in the Combined Heat & Power Association's *Agenda for Action.* We urge Government, the Office of Electricity Regulation, and planning authorities to either take or indicate their willingness to undertake the necessary actions.

LIGHT INDUSTRY AND COMMERCE

35. In many light industrial and commercial operations energy efficiency does not compete strongly for scarce managerial resources. Small businesses are slightly better placed than individual householders to act on generic advice such as the EEO/ACBE *Practical Energy Saving Guide* and the EEO *Best Practice Programme,* which are welcome and should be promoted even more intensively. Industry and commerce should increase its capacity to act on such advice by seeking and supporting in-service training in energy management for appropriate staff. Trade associations should promote EMAS by evaluating and publicising the commercial benefits of energy saving.

36. Minimum standards and an energy labelling scheme along the lines of those described for the domestic sector should be developed for common energy-intensive equipment in industry and commerce.

37. Thermal efficiency provisions in building regulations for light industrial and commercial premises should be tightened.

38. The Energy Saving Trust should consider whether its remit should include small businesses and offices.

ENERGY SUPPLIERS

39. The discussion document gives limited attention to measures other than a carbon/energy tax which could lead to more appropriate fuel choices. This is reasonable given the diversity and urgency of the programmes which are needed to promote energy efficiency and the fact that the coal review is already underway.

40. We believe that a carbon/energy tax along the lines discussed in paras 8.15-17 would be regressive and the measures required to protect vulnerable groups in the community and the UK competitiveness would be complicated. Government should press the European Commission for arrangements which would enable price signals to be given selectively to the market sectors which could respond appropriately. There should be flexibility to use revenue for energy efficiency programmes and other market interventions.

41. The differences which exist between fuels in energy to carbon ratios are an important factor in determining an appropriate fuel mix for a sustainable economy but many other economic and conservation factors must also be taken into account. The coal review will provide an opportunity for Government to make a preliminary statement on the balance between short, medium and long term considerations. As progress is made in evaluation of the full lifecycle costs of competing energy technologies Government should adopt more specific supply side policies within the framework of security, diversity, competitiveness and sustainability. It will be important not only to devise criteria which enable fossil fuel, nuclear, renewable technologies and CHP to be treated on an equivalent basis but also to enable supply and demand side measures to be compared fairly on the basis of full lifecycle costs with appropriate allowance for impacts on the environment.

INTEGRATION

42. The discussion document rightly stresses the importance of commitment to energy saving and carbon dioxide abatement at all levels from the individual to government. We believe that these commitments will be strengthened if there are opportunities to coordinate activities at sub national level. Government should promote regional energy studies and fora along the lines of those in London and Newcastle on Tyne which would bring together all those with practical interests in energy efficiency. The aim would be to secure through information exchange an optimal balance of measures relating to energy efficiency in the housing sector, transport, industry (including energy suppliers and partners in CHP), commerce and waste management.

CHEMICAL RELEASE INVENTORY

Introduction

In November 1992, the Department of Environment published for consultation proposals for the introduction of an annual inventory of releases (Chemical Release Inventory — CRI) of polluting substances from industrial processes. Experience of a similar inventory in the USA — the Toxic Release Inventory (TRI) — suggests that such an inventory can help regulatory bodies identify and target environmental problem areas and provide senior managers with a clear picture of the environmental consequences of their operations. An inventory can also provide environmental groups and the public with additional information which they can use to encourage industry to reduce or eliminate polluting releases.

It is intended that the inventory would provide aggregated data on releases of over 250 substances to air, land and water from industrial processes regulated under IPC.

The establishment of the inventory is not expected to impose additional burdens on industry — most of the information which would be required for the inventory has to be supplied to HMIP to enable them to monitor compliance with IPC authorisations. It is proposed that HMIP should compile the inventory from the monitoring data required under IPC authorisations for each calendar year from 1992 onwards.

NSCA Comments

NSCA believes that public access to information is an essential element in maintaining confidence in environmental protection. These proposals build usefully on the register-based public access system first proposed by DoE in 1989, reflecting the emphasis on the improvement of environmental data which is expressed in the EC *Fifth Action Programme for the Environment.*

In theory at least, the establishment of a CRI will assist in building an overall picture of polluting sources and in identifying particular industrial pollution "blackspots", which the Government is committed to eliminating by 2005. It has the potential to inform future policymaking and enable regulatory bodies to prioritise activities. Furthermore it could provide key data for wider emissions inventories which are an essential ingredient for national emission reduction plans and for sub-national air quality management. However the current proposals, taken in isolation, appear to have a number of weaknesses.

Few pollutants have nationally agreed monitoring methods or type-approved instrumentation for continuous or discontinuous monitoring. In most cases, accurate reporting of annual mass emissions can only be achieved on the basis of continuous monitoring; few processes give sufficiently consistent emissions to enable accurate calculation of annual mass releases on the basis of intermittent monitoring. In the absence of a fully accredited emission monitoring methodology (or acceptable alternatives based for example on raw material composition and plant factors), the accuracy and consistency of data will clearly be open to question. It is therefore essential that the quality assurance procedures detailed in Process Guidance Notes and reflected in individual process authorisations are fully implemented in order to ensure uniform data quality requirements across competing industries. We also anticipate that HMIP's own QA procedures would apply to the operation of the CRI system as a whole.

Assuming questions of data validity are fully addressed, the inventory will still represent a partial assessment of chemical releases. Substantial emissions arise from road transport and Part B processes, with lesser contributions from other non-prescribed processes; waste disposal operations; agricultural; commercial and domestic sources. For a CRI to be useful to the public, and to justify the costs of establishing such a system, emissions data for other sources must also be available to allow comparison. The Society wishes to see the development of sub-national emissions inventories which include all significant sources and form the basis for local air quality management strategies. The precise locus for control remains a matter for discussion, but we are keen to establish the principle.

NSCA research suggests that the register systems which have been set up under the *Environmental Protection Act 1990* have been little used to date, except by competing operators and consultants. The public appears to be largely unaware of the registers, but experience in the US shows that extensive use can be made of such a system. We therefore welcome the assurance that the UK system will be developed with a high degree of user-friendliness.

Scotland and Northern Ireland are excluded from these proposals; we recommend that a similar exercise utilising information gathered by HMIPI and DoE (Northern Ireland) be undertaken.

The consultation paper does not contain any estimate of the resources needed to create and maintain an inventory; NSCA, while welcoming the establishment of an inventory, is concerned that it should not be established at the expense of inspection and enforcement action.

DRAFT UK STRATEGY FOR REDUCING EMISSIONS OF VOLATILE ORGANIC COMPOUNDS

Introduction

In November 1992, the Department of Environment invited comments on its draft proposals for reducing emissions of volatile organic compounds (VOCs) and levels of ground level ozone. VOCs are emitted from a variety of sources, such as petrol storage and distribution, motor vehicles, solvent usage, industrial processes and natural sources. In the presence of sunlight they react with nitrogen oxides to form ground level ozone, which can cause health problems; some VOCs, such as benzene, are carcinogenic.

Measures to control VOC emissions are in place or are proposed, both at national and international levels; these include: under the UK's *Environmental Protection Act*, authorisations for industrial processes will include conditions to minimise or prevent releases of polluting substances; the European Commission has published a draft Directive to reduce VOC emissions during the storage and distribution of petrol (see below) and is to bring forward proposals to reduce VOC emissions from petrol station refuellings and from industrial sources; the UN-ECE VOC Protocol, to which the UK has agreed, calls on signatories to secure a 30 per cent overall reduction in VOC emissions by 1999 using 1988 as a base. The draft UK strategy document is largely concerned with meeting the UK's obligations under the Protocol.

NSCA Comments

In its response to the DoE, NSCA welcomed the document as a thorough review of the present state of knowledge about current and projected VOC emissions but questioned whether it qualified as a "strategy". NSCA suggested that it was more a summary of the various abatement initiatives already in train which, taken together, appear to put the UK on course to meet its existing UNECE obligations. The Second White Paper Annual Review (*This Common Inheritance — The Second Year Report,* Cm 2068, 1992) makes clear that Government policy towards air pollution control will increasingly be effects-based. The Society supports this approach and would like to see it applied to VOCs, with a strategy which sets sectoral targets based on environmental and human health criteria.

The strategy document acknowledges that the current mass emission estimates have a wide margin of error, and will be subject to further refinement. NSCA is convinced that an assessment of the cost-effectiveness of further abatement measures would be essential, in case future evaluation suggests that the 30 per cent target will not be attained and in anticipation of further measures under the Second Step VOC Protocol, which the UK supports. There may also be a need to move the emphasis from voluntary agreements to mandatory enforcement in instances where the former approach does not maximise cost-beneficial improvements.

Table 1 of the document which lists VOC emissions by source, indicates that, even allowing for the application of new vehicle emission standards, exhaust emissions from road vehicles will still be by far the largest single source of VOCs in 1999. The assumptions for forecasting road transport emissions may also be capable of further refinement particularly assumptions about the spatial distribution of traffic growth, changes in driving patterns, and market penetration of diesel cars. The document notes that traffic growth is an issue *"which will also have to be addressed".* but offers no comment about how this will be undertaken. Given the increasingly dominant contribution of the road transport sector to air pollution, NSCA believes that a strategic approach is required to reduce its total environmental impact, of which VOC emissions are but one component.

The draft strategy document includes two examples of incidental environmental impacts which, if the strategy were subjected to a full environmental impact assessment, might result in a reordering of priorities. The first concerns the toxic and carcinogenic nature of VOCs. Compounds such as benzene and 1, 3 butadiene have low photochemical ozone creation potential (POCP) but are suspected of direct health impacts. In devising an effects-based strategy for reducing VOCs, a matrix which scores for a range of effects, including photochemical oxidant formation and toxicity might produce a more optimal ordering of abatement priorities. The second example is the advice in the technical annex to paint oil storage tanks white to reduce heat absorbance. The (apparently small) reduction in emissions achieved may not always justify the considerable visual intrusion which would result. Guidance should recommend that those responsible for tank painting should consider both VOC and visual intrusion at the site concerned before reaching a decision, thus underlining the importance of tailoring environmental protection to local circumstances.

With regard to industrial emissions, NSCA notes that current IPR and PG notes for Part A and B processes focus almost exclusively on end-of-the-pipe pollution abtement techniques. The Society urges that greater emphasis should be given to waste minimisation in official guidance and authorisation conditions. Whilst the individual contribution of operators below the Part B solvent usage thresholds may be small, collectively their solvent emissions may be significant. NSCA urges that a full evaluation of this sector be undertaken, to inform the forthcoming discussions on a downward revision of solvent usage thresholds under SI 472 (*Environmental Protection (Prescribed Processes and Substances) Regulations 1991,* amended 1992).

With regard to emissions from small combustion sources, these are only an important source where they are operating inefficiently. The Society notes that in some countries a periodic check of boiler and flue efficiency is a statutory requirement; the effect of such a requirement on UK emissions of VOCs and carbon dioxide could be evaluated. As a minimum, consideration should be given to a programme to raise public awareness about the importance of boiler maintenance.

CONTROL OF VOC EMISSIONS DURING PETROL STORAGE AND DISTRIBUTION

Draft EC Directive Com(92)277 Final

This proposal for a Directive forms part of the European Community's strategy for reducing manmade emissions of VOCs from a variety of sources. It concerns evaporative emissions of VOCs from the storage of petrol and its distribution from terminals to service stations — so-called Stage 1 Directive. Emissions from these sources throughout the EC are estimated to be 500,000 tonnes a year, 5 per cent of total VOC emissions; the proposed Directive aims to reduce these by 90 per cent. A second Directive — Stage 2 — will propose measures to reduce VOC emissions during refuellings at petrol stations. European Community Ministers have already agreed a Directive, which came into force on 1 January 1993, which reduces VOC emissions from motor vehicle exhausts.

In a memorandum to the House of Lords European Communities Committee (Environment and Social Affairs Sub-Committee) NSCA welcomed the overall target of the proposed Directive as an important contribution to environmental protection, economic development and resource conservation. Realisation of the Directive's objective in the UK would secure a significant part of the UK's obligations under the United Nations Economic Commission for Europe (UN-ECE) VOC Protocol cost-effectively. The result should be a reduction in the severity of ozone pollution problems in general and of odour nuisance in the vicinity of service stations and distribution terminals.

The Society is concerned that the draft Directive has the following weaknesses:

- Annex 1, paragraph 1 would require the use of high reflectance paint on all storage tanks. This could increase the conspicuousness of some terminals and might be in conflict with existing planning requirements. The Society considers that the Directive should allow scope for local negotiation having regard to the best practicable environmental option for the site concerned.
- Annex 1, paragraph 2 specifies the performance of the seals on storage tank roofs relative to VOC containment in a fixed roof tank without vapour control. The Society considers that such conditions would be difficult if not impossible to enforce and would prefer the Directive to specify technologies and maintenance regimes. Primary seals should be liquid mounted and secondary seals should be fitted to all tanks with external floating roofs. Tank walls should be maintained to standards which prevent capillary losses around seals.
- Annex 2, paragraph 1 recognises that current technology for vapour recovery may be inappropriate for use in barge or ship loading and permits incineration. The Society considers that the Directive should provide incentives for the development of vapour containment technologies, appropriate for use in barge and ship loading which do not have the safety, resource depletion and carbon dioxide emission implications of incineration.
- Annex 2, paragraph 2 specifies best available technology for vapour recovery units (VRUs). The Society considers that the Directive should recognise the possibility of performance below design specification and erosion of performance in service. A more realistic performance standard, but still in excess of 90 per cent, should be coupled with specification of maintenance requirements and frequency of performance verification. The Directive should also recognise that the commercial value of recovered VOCs will provide a powerful incentive for further improvement in the efficiency of VRUs and standards, effectively BATNEEC, should be kept under review.

Overall the Society considers that the Directive should be drafted in a way which would permit it to be implemented in a manner comparable to the regulation of prescribed processes under the *Environmental Protection Act 1990.* The requirements of the Directive could then be incorporated into an authorisation and upgrading plan for each component of the petrol distribution chain which would cover technology, management, monitoring and training.

LOCAL GOVERNMENT REORGANISATION AND THE ENVIRONMENT

Three recent developments promise major change for local authorities' role in environmental protection: the creation of new Environment Agencies for England and Wales, and for Scotland; the establishment of statutory environmental health performance indicators for the Citizen's Charter; and the programme of local government restructuring now being proposed for England, Wales and Scotland.

NSCA is concerned that the three developments appear to be occurring in parallel, missing the opportunity to integrate the proposals in order to optimise the delivery of local environmental protection services.

The Society identifies an urgent need for consensus on the future role of local government in environmental protection. Proposals for reorganisation and the Environment Agency must be interwoven; the choice of LA performance indicators must reflect the full range of LA environmental protection responsibilities. We therefore call for improved dialogue between the Department of Environment team working on the Environment Agency, the Audit Commission, the Local Government Commission, the Welsh and Scottish Offices, the Local Authority Associations, and the professional institutions.

The Department of the Environment's Policy Guidance to the Local Government Commission for England (July 1992) makes only brief reference to the environmental protection function of LAs, stating that *"the Commission should consider the need for better environmental protection in looking at proposals for change to local authority structure".* and listing current environmental responsibilities.

Those (District) LA submissions to the Local Government Commission which have been seen by NSCA also give scant reference to environmental protection, mainly referring to existing environmental health functions. LA responsibility for environmental matters is considerably broader than this, and LAs have further capacity to develop a role as regulator, educator, purchaser, and sounding board for public opinion. They have the potential to establish a focal role in managing local environmental quality.

Local government has a long track record in environmental protection. The Society believes that the process of reorganisation should not proceed without a thorough evaluation of the potential for integrating the very wide range of environmental protection concerns into a coherent local framework. As with central government, LA environmental responsibility is spread between a number of departments. Reorganisation therefore offers an opportunity to identify environmental protection as a strategic function within an authority which draws together everything from pollution control and waste regulation to land use planning and highway construction. Unitary status will not necessarily be the universal outcome of the review process. Where it is not, mechanisms for coordination and strategic action across local government must be established.

We would wish to see more explicit proposals which show how environmental protection functions will be represented in the political and management structures proposed for the new authorities, and evidence of the technical capacity of the proposed new authorities to fulfil such functions.

We would also wish to see a more far-sighted assessment of the role of new LA structures in promoting custody and stewardship of the environment in the context of sustainable development. The Earth Summit Agenda 21 and the EC Fifth Action Programme for the Environment both identify a wide range of roles for LAs in managing environmental quality. One measure of the appropriateness of new structures will be the Community Index, and we would wish to see due emphasis on the importance of access, democracy and accountability in environmental protection issues.

The principle of subsidiarity suggests an increasing mandate for sub-national environmental regulation and management. The structure of local authorities will need to adapt accordingly, and the local manifestation of the Environment Agency will be a determining factor. NSCA has made the case for regional EA offices with regional fora to strengthen local partnership and accountability. However the question of the division of responsibility between a new EA and current regional or local agencies must dovetail with reorganisation proposals.

Larger single tier local authorities would be better equipped to provide the technical expertise both for waste regulation and for extending Integrated Pollution Control to Part B Processes. They would also be well placed to undertake local EA functions under voluntary service agreements. In this light, the recent announcement confirming proposals to shift local authority responsibility for air pollution control in Scotland to the Scottish Environment Protection Agency is clearly a backward step.

The aim must be for a structure which manages the full range of local environmental quality determinants in an open and accountable manner. Local government is uniquely answerable to the community and is thus in a unique position to enable and empower the community it serves, to protect and improve the environment it inhabits.

UK NOISE POLICY — WHERE NEXT?
A NSCA DISCUSSION PAPER

NSCA is one of the few organisations campaigning on noise issues. The Society's National Noise Committee has worked on a wide range of noise policy matters, and recently considered this discussion paper, which looks at the feasibility of introducing targets for UK noise policy. The paper will be considered at the next meeting of the DOE's Noise Review Forum, and we would welcome comments from readers of Clean Air and NSCA members.

1. Why the UK needs a National Noise Policy

For a significant proportion of the population, noise pollution is their most immediate and pressing environmental problem. Yet the UK lacks a coherent noise control policy. Without a policy consisting of targets and a strategy for attaining them, it is difficult if not impossible to set priorities or gauge progress. Clear and realistic goals also make it possible to gain support for measures which otherwise might be unacceptable or controversial. Essentially, we need to know:

a) Where we are
b) Where we want to be
c) The plan for getting from (a) to (b)

The 1990 Batho Report reviewed noise legislation and made a number of recommendations, many of which have been translated into legislation, regulation or future commitments in the White Paper on the Environment, *This Common Inheritance* (TCI).

The 1992 TCI Second Year Report lists seventeen original TCI commitments on noise, reviews action to date, and makes commitments to further action. Most of this is welcomed by NSCA. But a list of control measures on its own, without measurable aims and objectives, cannot truly be described as a policy.

Compare this with the chapter on Air Quality in the same report. This contains some very specific policy goals and targets:

> ". . . By 2005, the Government's current policies will remove any remaining significant health risks; get rid of all serious industrial pollution blackspots; greatly reduce the areas of the UK subject to continuing acid rain damage . . ."
>
> How will they do this?
>
> ". . . The first stage in this process involves thorough measurement of trends in air quality . . .The next stage is to develop guidelines and targets against which we can measure the progress of pollution control . . .the Government is developing descriptive bandings of pollutants . . .targets, guidelines or standards to guide control of particular pollutants . . .New standards of these kinds will help to give a clearer focus to abatement action."

In the real world we accept that some pollution is inevitable. We can also try to define the levels of pollution which are tolerable. In the case of air pollution, critical loads (for ecosystems) and air quality guidelines (for human health) are being developed for an increasing range of pollutants. These are "effects-based" targets; they are designed to reduce the effects of pollutants to acceptable levels. A range of policy instruments is then developed to attain those targets.

A similar framework is developing for water pollution (water quality objectives) and waste management (recycling targets), but we have yet to see this sort of language being used in the realm of noise control. Could noise policy be driven by environmental quality objectives?

2. Targets for Noise Policy

The air quality policy framework is becoming quantitative. A similar approach could work for noise policy. To provide a coherent framework there would need to be agreement on:

- Whether noise is an environmental problem, whether it is getting better or worse, and where.
- Whether we want it to get better (or worse), and where.
- How we could measure the improvements we seek.
- What are the most efficient and cost-effective ways of bringing about those improvements.

But there are difficulties with this approach:

- If we want targets which are effects-based, what are the effects we are trying to mitigate? The effects of noise are often difficult to measure.
- If there was agreement on effects, what targets would be appropriate? Could, for instance, a target for the reduction of sleep disturbance be related to ambient noise levels?
- How would improvements be measured? There is no national noise monitoring network against which to measure any improvements.

3. Where are we?

There is already some information to answer this question. The Building Research Establishment has produced National Noise Incidence data from a study of 1000 households (fig 1). Local authorities are beginning to include information in local state of the environment reports (eg the Lancashire Green Audit). Data on complaints, clear-up rates, notices served, etc, is available (fig 2). The Audit Commission is likely to set noise response performance indicators for local authorities, providing another measurable parameter.

4. Where do we want to be?

Could measurable environmental quality objectives form a suitable basis for target setting? Some attempts have already been made.

The EC 5th Action Programme sets explicit targets for the year 2000 (fig 3), citing "serious health risks" from night-time exposure to noise levels exceeding 65 dB(L_{Aeq}). It also incorporates a "no deterioration" level of 55 dB(L_{Aeq}), above which people should not suffer further increase. Is the UK on track to meet these targets?

Transport 2000 has also suggested a series of transport noise targets (fig 4) as part of a larger package of targets for the UK transport sector.

The number of roadside noise tests undertaken, and rectification action required, by the Department of Transport could be another useful index.

For the domestic sector, targets based on complaint clear-up would be one possibility, but may not be the most reliable indicator of effectiveness.

Noise specialists agree that many noise nuisance problems derive from changing social attitudes. Public attitude polls might also provide a useful indicator of trends.

The 1992 TCI Second Year Report details the Government's current programme on noise. But is it enough? Alternatively, is it too much? Are the extra costs which might be imposed on vehicle manufacturing, road construction, airlines, housebuilders and local authority environmental protection departments justified by the improvements we hope to obtain? And how do we know if we're obtaining them?

5. How could we get there?

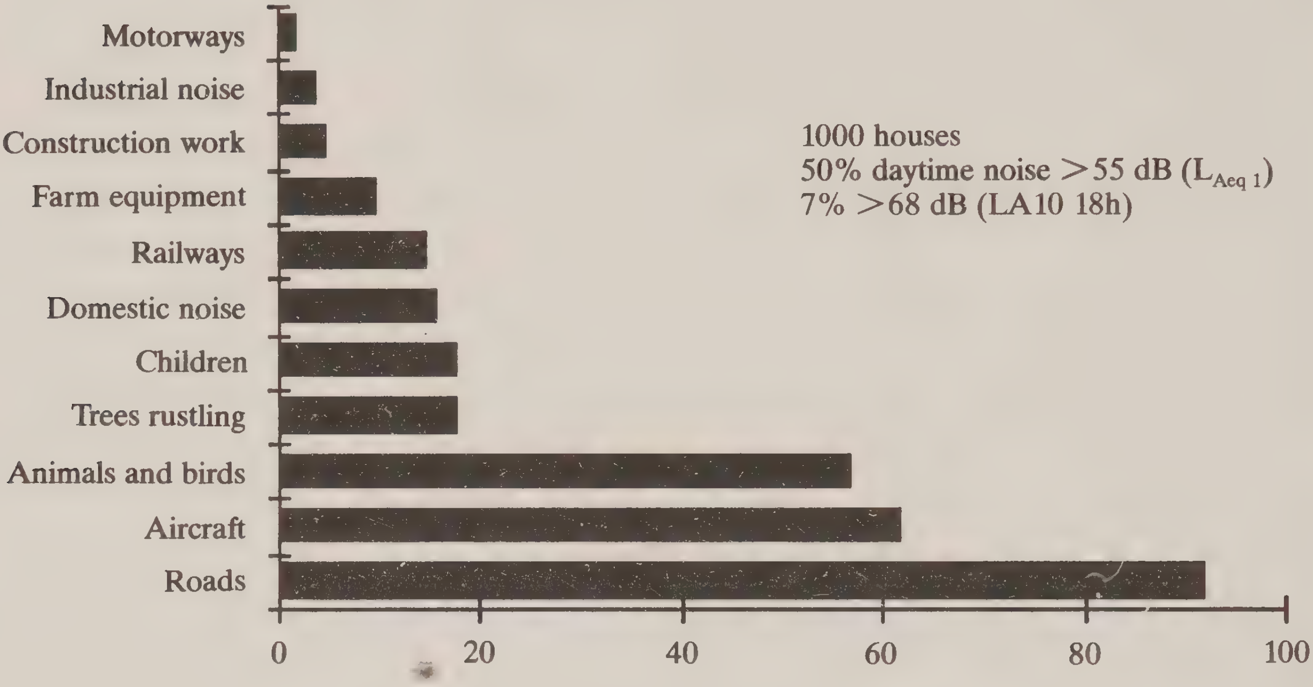
As yet, there is no consensus on whether it is realistic to base a noise policy on targets or whether, by concentrating only on measurable performance indicators, we might end up measuring the wood whilst ignoring the trees. The setting of environmental quality objectives would need to take account of public expectations and perceptions, and be related to exposure.

Perhaps, to follow the air quality model, the Government's next step should be to appoint an independent review group to advise on:

- the effects of noise on health and amenity;
- meaningful indicators of the incidence of noise in the environment;
- the most appropriate means of monitoring trends;
- the development of noise standards, guidelines and targets.

Such independent expert advice would provide a yardstick against which the optimum balance of source controls and quality objectives could be measured. By creating such a framework we would stand a better chance of maximising local environmental quality whilst minimising the deployment of resources — a policy strategy for cost-effective quiet.

Figure 1. Noise sources outside dwellings, 1990
England and Wales

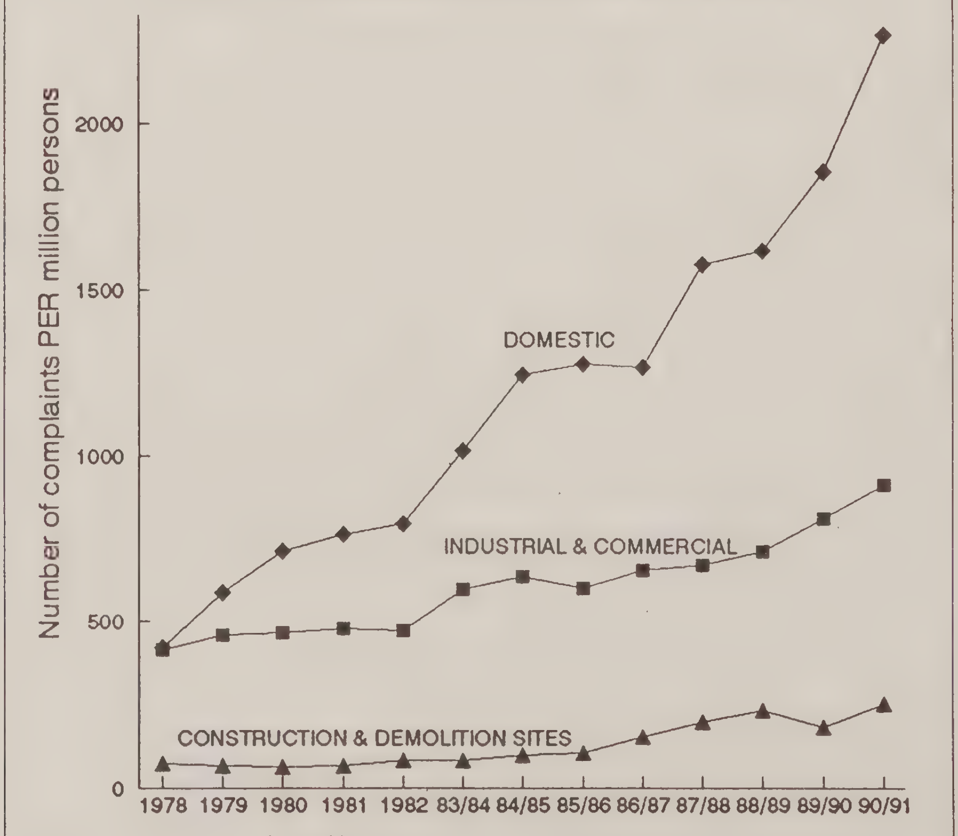


1000 houses
50% daytime noise >55 dB ($L_{Aeq\ 1}$)
7% >68 dB (LA10 18h)

% of sample sites at which noise source was recorded
Source: BRE

Figure 2

Noise complaints received by EHOs



Source: Environmental Health Reports; EHOA (1978-79), IEHO (1980-91)

Figure 3

OBJECTIVE	EC TARGETS UP TO 2000	ACTIONS	TIME-FRAME
• No person should be exposed to noise levels which endanger health and quality of life.	Night-time exposure levels in Leq dB(A): • exposure of the population to noise levels in excess of 65 should be phased out; at no point in time a level of 85 should be exceeded.	• inventory of exposure levels in the EC	before 1994
		• noise abatement programmes to be set up	before 1995
	• proportion of population at present exposed to levels between 55-65 should not suffer any increase.	• further reductions of noise emissions (cars, trucks, aircraft, cranes, mowers, etc.) Directives to be presented progressively, aiming at implementation not later than 2000.	before 1995
	• proportion of population at present exposed to levels less than 55 should not suffer any increase above that level.	• standardization of noise measurement and ratings.	continuous
		• measures to influence behaviour, such as driving cars, flight procedures, industrial processes operating at night time.	id
		• measures related to infrastructure and physical planning, such as better zoning around airports, industrial areas, main roads and railways.	id

Source: EC 5th Action Programme Vol II

Figure 4. Proposed standards for transport noise (dB(A))

	2000	2010	2020	2030
Kerbside 24 hours:				
Peak	—	75	70	65
Average (L10)	68	60	55	55
Indoor 9pm-7am:				
Peak	65	60	55	50
Average (L10)	60	55	50	40

Source: Transport 2000

NSCA NEWS

LOCAL AIR QUALITY MANAGEMENT

The Way Forward for the UK

Report on NSCA Development Workshop,
Birmingham, 24 February 1993

Introduction

To manage local air quality we have to know what it is, what affects it and how to deal with the threats to it. Technical change is providing new opportunities in ambient air quality monitoring, compilation of emissions inventories and the processing and interpretation of data. Proposals for the establishment of an Environmental Agency and the reorganisation of local government point to a period of unprecedented institutional change. New policies for public access to information, performance indicators for public services, and changing popular perceptions in relation to health and conservation issues, increase the need for priorities to be based on rational analysis and mean closer scrutiny of official action and greater external influence on it.

All of these changes are taking place at a time when economic problems and social pressures are increasing competition for resources in the economy. Government policy also favours deregulation. This, coupled with the natural and justifiable tendency to restrict public services to the statutory minimum, means that all aspects of air quality management will be subject to careful evaluation.

NSCA's first Development Workshop which attracted 165 delegates was convened to assist all those involved in air quality management to determine priorities at a time of change, and to examine the 'tools for the trade' for air quality management. A second workshop, on 23 June, also in Birmingham, will look at methods for setting priorities for air quality management through an examination of methods and outcomes of hazard identification, risk analysis and management.

The Principles of Air Quality Management

Dr. Roger Barrowcliffe, Environmental Resources Ltd, outlined a framework for air quality management which he illustrated by reference to strategies which are being implemented in areas of diverse topography, climate, settlement, economic development and air quality objectives. He pointed out that air quality management at the local, regional and national level would become more important as the UK moved from an air pollution control system which was almost exclusively based on emission standards to one which placed greater emphasis on ambient air quality standards. Positive air quality management would also be important in delivering UK commitments under international agreements. For both purposes clear identification of responsibilities would be essential. It was vital to know who was the air quality manager.

Dr. Duncan Laxen, Rendel Science & Environment, reviewed the characteristics of various methods for air quality monitoring in terms of the chemical, spatial and temporal resolution which they could offer in relation to the cost. He highlighted the importance of compatibility between national, regional and local monitoring initiatives, which could be secured by type approval of monitoring equipment for particular purposes and the implementation of appropriate quality assurance regimes. For those planning local air quality monitoring initiatives, the two most important factors were clear definition of objectives for the outset, and an appreciation of the lifetime cost of the initiative over the period required to meet the objectives.

Dr. Roger Timmis, Warren Spring Laboratory, explained the nature of emission inventories and described the methods which can be used to compile them; he then discussed the factors which should be taken into account when designing an inventory and reviewing sources of information.

Warren Spring Laboratory maintains the National Atmospheric Emissions Inventory (NAEI) and an associated database of air pollutant emission estimates and forecasts, together with statistics on energy consumption, population, employment, traffic flows, emission factors, growth factors, and point source details. Retrievals from the database in the form of computer printouts or transferable magnetic media can be made in response to specific enquiries from organisation or individuals, subject to certain conditions and a charge to recover computing costs.

Dr. F. Barry Smith, Imperial College, examined the adequacy of models to predict the dispersal of pollutants for scales:

α 0-100 metres dispersion influenced mainly by turbulence in the wake of the source. Generally adequate models are available.

β 100-300 metres, the scale appropriate to dealing with street blocks and small open spaces. Understanding pollutant dispersion at this scale is important in predicting the effects of traffic and models are generally unsatisfactory. Some progress has been made towards representing urban areas as a series of interconnecting ‘bubbles’ using permeability factors to estimate exchange between them. More research is needed to provide robust and reliable models which can accommodate real situations.

δ 300 metres-5 kilometres, the ‘escape’ scale for dispersion of pollutants away from urban areas.

γ 5-20 kilometres, the scale of resolution for regional descriptions of pollution levels.

Models which can give predictions which have practical value in informing planning decisions, guiding pollution control enforcement and assisting incident management are available at the δ and γ scales. Dr. Smith produced, some time ago, a simple guide to the effects of wind speed, topography and surface roughness, temperature, temperature gradient and relative humidity on dispersion, and the ways in which these factors can be incorporated into simple practical predictive models. Dr.

Smith mentioned a number of useful reference books on modelling, details of which are included in the Workshop Resource Pack — see below.

The Practice of Air Quality Management

During the afternoon, there were three papers on air quality management looking at UK, European and US experience.

Cameron Stathers, Sheffield City Council, outlined the application of monitoring, emission inventories and modelling in Sheffield using computer aided air quality management. He said that in September 1991 Sheffield became the first UK city to realise the future necessity of CAAM by installing an Indic Airviro system to tackle all its air pollution problems including stationary sources and road traffic. The system is capable of employing a range of different inputs, such as: historic and real time air quality data, digital topographic mapping, weather data, a stationary emission database and even real time road traffic flow figures. On the output side a range of functions and users would also exist. For instance the dispersion modelling function provides a very cost effective means of assessing the impact of current emitters, but it can be utilised more successfully as a pro-active tool in assessing the possible effect of new planning applications or emission reduction regimes.

In addition to stationary sources it is also possible to perform a similar range of functions in the field of road traffic management, where the effects of current or new road schemes and/or road traffic management schemes, on air quality could be assessed. In a comprehensively developed system the real time dispersion modelling of gaseous plumes would provide Emergency Services with the means of targeting their resources in terms of evacuation areas and the appropriate level of protection.

Since its installation the Sheffield system has been initially developed in two principal areas: data acquisition from the city's air quality monitoring network and the dispersion modelling of several complex industrial sources.

Leif Carlsson, City of Gothenburg, Sweden, described the policies and methods which are used to manage air quality in the Gothenburg region. Eleven communities are represented in the Gothenburg Regional Association of Local Authorities, which takes responsibility for matters of regional importance such as air quality. About half the members of the Regional Board are drawn from industry. Thus its decisions are based on a general cooperative relationship between industry and government. Air quality management decisions are reached on consideration of the impacts of industry, traffic and residential settlement. Considerable importance is attached to predicting the effects of land planning and development on air quality. Installation of a comprehensive system for air quality management commenced in 1988 and development is still continuing. The heart of the system is an emissions inventory database, which can be related to the output from five meteorological stations in the Gothenburg area and six ambient air quality monitoring stations.

Keith Mason, Centre for Exploitation of Science & Technology, outlined the evolution of air pollution control in the US over the past three decades. This has led to a system based on national ambient air quality standards for particulates, sulphur dioxide, nitrogen dioxide, ozone, lead and carbon monoxide, emissions standards for mobile and stationary sources, and a risk-based strategy for hazardous air pollutants. Irrespective of these standards, there is a general presumption against significant air quality deterioration at local level. The air pollution control system requires States to produce implementation plans which specify appropriate combinations of Federal and local measures to achieve compliance in air quality areas, depending upon the severity of air pollution problems in these areas.

The Way Ahead in the UK

Professor Roy Harrison, University of Birmingham, reviewed the contributions to the meeting before giving his own priorities for the development of air quality management in the UK as a stimulus to discussion. The main points arising from contributions to the meeting, Professor Harrison's review, and subsequent discussion were:

The Framework for Air Quality Management

- The roles of the EC, HMG and LAs should be defined more clearly, so that there is no doubt where responsibility lies for the various aspects of air quality management. It is vital to know who is the air quality manager.
- Air quality management plans for appropriate geographic units, similar to the State Implementation Plans in the US and the County Plans which are used to build it up, or the Gothenburg Regional Plan, represent a useful concept which should be examined further in the UK. The aim should be to enable local air quality managers to choose the combination of measures appropriate to local circumstances and which would provide, by an agreed target date, a desired level of local air quality as well as meeting local, regional and international requirements. National guidance should be provided on standards, guidelines and methods, thus making the approach local choice from a national menu.
- The following developments would facilitate local choice from a national menu:

Air Quality Monitoring

Guidelines are needed for securing the optimum balance between passive samplers and continuous automatic analysers to give the most appropriate picture for local conditions within resource limits.

- Passive samplers are useful for evaluating spatial patterns, but national guidance is required on protocols for air sampling and analysis.
- Continuous automatic analysers give high temporal resolution but a national scheme is required for type approval of instruments, and there should be central guidance on calibration protocols, siting criteria and QA/QC procedures if data collected for local purposes is to become a useful part of the national picture. Consideration should be given to central funding for site audits, QA/QC and data dissemination. Guidance should be available also on methods for assessing the lifetime cost of an air quality monitoring programme of sufficient length to meet its objective.

Source Inventories are an essential component of air quality management:

- Guidance and training should be provided at national level for people with access to local knowledge and databases. There should be national guidance on key emission factors which could be updated as knowledge improves.

- Access to the National Atmospheric Emissions Inventory should be facilitated and its spatial and source type disaggregation should be enhanced wherever possible.

Air Quality Modelling

- The urban air quality models which are at present available commercially have serious weaknesses in their ability to predict ground level concentrations of pollutants on the 100 metres-1 kilometre scale. These weaknesses arise from difficulties in handling both physical dispersion and chemical transformation of pollutants. Priority should be given to the development of a flexible urban 'airshed' model.
- Central guidance and training on the use of air quality models should be available.

Demonstration Projects

Demonstration projects are needed to establish the validity of air quality management, such as traffic control.

- To be convincing, projects should involve an appropriately large area and be of adequate duration to be monitored with sufficient intensity to validate a numerical model which could then be used to evaluate alternative scenarios.
- Wide collaboration is likely to contribute to the success of a demonstration project; for example, the Demetrius Project in Birmingham involves the City Council, the Meteorological Office, the University, the Regional Health Authority, the transport utility, and a range of consultants.

National Policy

- There should be an obligation to provide a balanced and responsive approach to air quality monitoring and this should be reflected in the UK stance in negotiation of the Air Framework Directive.

Resource Pack

NSCA has put together a resource pack summarising the contributions to the workshop and including copies of background papers, speakers notes and other materials used, as available. The Resource Pack is priced £10 including postage and packing.

WATER AND WASTE IN THE SOUTH EAST

On 1 December 1992, the NSCA's South East Division held a seminar on Water and Waste in the South East – Environmental Challenges for the Nineties. This was a new venture for the Division as it was the first time the Society had broached the subject of the inter-reaction between contaminated land and water pollution. Over 80 delegates including many students from universities and colleges from the South East were in attendance.

Professor the Lord Lewis of Newnham, Chairman of the Royal Commission on Environmental Pollution 1991/2, gave the keynote address. His main theme was the growing problem of water quality from waste disposal. The full address was published in the winter 1992 edition of *Clean Air.* Other speakers dealt with protection of groundwater, water pollution from agriculture, contaminated and derelict land, landfill, incineration, landfill management and the legal implications of contaminated land. The seminar raised many issues some contentious but revealed an awareness and a determination to deal with problems facing those concerned with the protection of water and the disposal of waste.

The Division has joined forces with the South East Institute of Public Health with a view to running a series of seminars on issues of topical environmental interest. The first is proposed for late June this year and will deal with planning, pollution and the environment. Further details will be published in the next edition of *Clean Air.*

ENERGY CONSERVATION BILL

NSCA has given its support to the above Bill which was introduced by Cynog Dafis MP (Plaid Cymru) in association with the Green Party and has cross-party support. The Bill will require district and borough councils to draw up, after extensive public consultation, energy conservation plans for their area in order to achieve savings of up to 30 per cent. The plans will assess the job creation prospects of such a programme of works, the expected reduction in fuel bills and the resulting reduction in emissions of carbon dioxide, sulphur dioxide and nitrogen oxides.

The Bill would establish Energy Conservation Boards to advise and monitor progress; the Secretary of State would have a duty to draw up a timetable for implementing energy conservation plans, and to provide the necessary money for local authorities (which could be raised by a fuel levy).

SCOTTISH ENVIRONMENTAL PROTECTION AGENCY

The Scottish Office has announced that legislation is to be introduced establishing a Scottish Environmental Protection Agency. It has been decided that the Agency should be set up along the lines proposed in the January 1992 consultation document: i.e. the Agency will assume the pollution control responsibilities of the River Purification Authorities, HM Industrial Pollution Inspectorate and the District and Islands Councils (in respect of waste management and air pollution).

In a statement to the press, NSCA's Scottish Division expressed regret at the decision to transfer local authority responsibility for pollution control to the Agency. The Division's President, Cllr David Munn, pointed out that district councils had been the licensing authorities for waste disposal since the introduction of COPA 1974 and that there was no evidence that this duty had not been carried out satisfactorily. Cllr Munn also pointed out that local air pollution control is not to be included in the remit of the English & Welsh EPA; he drew attention to a statement to the all party Environment Committee in which the Government say that processes currently controlled by local authorities "...are generally less complex, do not give rise to significant cross media issues and tend to cause local pollution problems which makes them suitable for local government control". SEPA, in the shape and form now being proposed, would inevitably be more remote, less accountable and less responsive than the local authorities.

REPORTS

VISIBILITY IN THE UK, 1962-1990

Dr. Derek O. Lee
Department of Geography
Birkbeck College

The relationship between air pollution and visibility is well-known and has always been particularly noticeable in urban areas where the scattering and absorption of light by aerosols and gaseous pollutants is greatest. Visibility is inversely proportional to the total atmospheric extinction coefficient (b_{ext}), which is the sum of gaseous molecular scattering (b_{sg}) and absorption (b_{ag}) and aerosol scattering (b_{sp}) and absorption (b_{ap}) (Waggoner *et al,* 1981). Particle scattering of light (b_{sp}), mainly by smoke and aerosol sulphate particles, is normally the most important component of the total atmospheric extinction coefficient. (e.g. QUARG, 1993) but in some urban areas particle absorption (largely by elemental carbon) and gaseous absorption (mainly nitrogen dioxide), both originating largely from motor vehicle exhaust emissions, may also be a minor factor. In rural areas, the atmospheric extinction is dominated by scattering, largely by sulphate and to a lesser extent nitrate aerosols (Waggoner *et al,* 1981). The influence of various air pollutants on visibility will therefore vary both in space and time.

As well as air pollution, meteorological variables such as the frequency of rain, the incidence of 'natural' water-droplet fogs and the humidity of the air, affecting hygroscopic aerosols, will also exert some influence on visibility. Long-term changes in atmospheric circulation patterns may also affect the frequency of visibility-reducing conditions such as rain or anticyclones with their associated light winds and restricted mixing depths, or the frequency of polluted airmasses transported into the UK from continental Europe. (e.g. Briffa *et al,* 1990; Davies *et al,* 1986, 1991; Mayes, 1991, O'Hare and Sweeney, 1993).

The amenity value of good visibility is important in both urban and rural areas and public awareness and concern about air quality is therefore often linked to visibility deterioration. Although many studies in the years following the *Clean Air Acts* have demonstrated the beneficial effects of reduced domestic smoke emissions on the climate of cities (e.g. Atkins, 1968; Chandler, 1976; Jenkins, 1971; Unsworth, *et al,* 1979; Gomez and Smith, 1984), more recent studies have suggested that some areas of the UK, especially in the south, have been increasingly subject to photochemical air pollution episodes and the associated haze, originating both from precursor emissions from cities in the UK especially Greater London (e.g. Ball, 1976; Ball and Bernard, 1978; Varey *et al,* 1988) and also from the long-range transport of polluted airmasses from continental Europe, especially during summer anticyclonic conditions (e.g. Atkins *et al,* 1972; Cox *et al,* 1975; Barnes and Lee, 1978; Lee, 1983, 1990).

There are relatively few studies of long term visibility changes in the UK mainly in cities and at some rural sites, especially in the south. This paper illustrates long-term visibility trends at three different types of site within the UK and identifies some relationships between these trends and changes in air pollution emissions.

Data

Visibility data is readily available for about 100 sites in the UK and is published in summary form in the Meteorological Office *Monthly Weather Report* and *Annual Summary.* However, the number of stations which have an unbroken record over the 1962-1990 period is limited. The sites used in this study therefore represent a compromise between good spatial coverage and continuity of record. Fifteen sites were selected to represent visibility conditions at three different types of location; urban/ industrial, coastal, and inland rural. At each site, the annual summary visibility statistics for five visibility classes; 0-3.9 km, 4-9 km, 10-19 km, 20-39 km, and >40 km were selected for the 1500 hr observation time which, it was assumed, would provide the most representative indication of prevailing visibility levels by minimising the effects of overnight radiation fogs, high relative humidities, or the accumulation of locally emitted air pollution. Cumulative frequency distributions were used to calculate the value of the 50th percentile, or median visibility i.e. the visibility likely to be exceeded in 50 per cent of the observations. The data represent all observations, regardless of meteorological conditions. Median visibility (V) expressed in units of km can be directly transformed into atmospheric extinction coefficient (b_{ext}) through the Koschmeider visibility relationship, where bext. = 3.9/V.

Analysis

Five sites for each of the three types of location were used to construct the time series shown in Figure 1. The urban/industrial sites were Elmdon (Birmingham), Heathrow (London), Ringway (Manchester), Squires Gate (Blackpool), and Finningley (N. Yorkshire); the inland rural sites were Boscombe Down, Gatwick, Lyneham, Stansted and Leeming and the coastal sites were Aberporth, Rhoose, Manston, Prestwick and Leuchars. Figure 1 shows the visibility anomalies over the 1962-1990 period, i.e. the deviations of the annual mean value for each group from the overall 1962-90 mean for that group. It is clear that, despite the very different nature of the locations, the observed trends show many common features. The similarity in the year-to-year variability at all three sites is probably explained by large scale meteorological influences, whereas the overall long-term trend is much more likely to be related to trends in air pollution emissions.

The period divides very clearly into two, with generally below average visibilities until 1973 and a rapid and substantial improvement after that date. This pattern has been commented on previously (Lee, 1983, 1990), and is possibly related to changes in sulphur dioxide emissions and associated sulphate aerosol formation after the first oil crisis in 1973. Visibility improvement occurred in all atmospheric circulation types suggesting that changes in the frequency of particular circulation types was not the major influence on long-term visibility trends. However there have also been very significant decreases in smoke emissions over the same period (Eggleston *et al,* 1992; Gillham *et al,* 1992) (Figure 2). This decline in smoke emissions, especially in urban areas from domestic sources, is undoubtedly the single most important factor in the improvement in visibility at the 'urban/industrial' sites despite the recent upward trend in smoke emissions from motor vehicles. Figure 3 illustrates the very clear relationship between the mean annual extinction coefficient (b_{ext}), calculated for the urban/industrial sites and smoke emissions from domestic and motor vehicle sources.

Table 1 illustrates the change in the average annual median visibility for the three groups of sites over the 29 year period. Urban visibilities have more than doubled in this time and are now very similar to those at the inland rural sites and exceed those at coastal locations. The fact that visibility at all three types of location, some of which are remote from major pollution sources, has improved over this period suggests either that climatic changes have played some part in the improvements, or that even at quite remote coastal locations, the long-range transport of air pollution exerts an influence on visibility.

Table 1. Annual average median visibility (km) at urban, inland rural and coastal sites

Year	Urban	Inland rural	Coastal
1962	11.3	17.7	21.1
1970	13.3	16.2	18.0
1980	19.8	24.3	20.6
1990	25.3	26.5	24.8

Conclusion

Whatever the exact combination of causes, it is apparent that, despite concern about the incidence of photochemical haze, and increased emissions from road traffic, the atmosphere over much of the UK is now clearer than at any time for several decades. However, any further significant improvements may be much more difficult to attain against this background of rising motor vehicle emissions and the long-range transport of polluted air masses across national boundaries.

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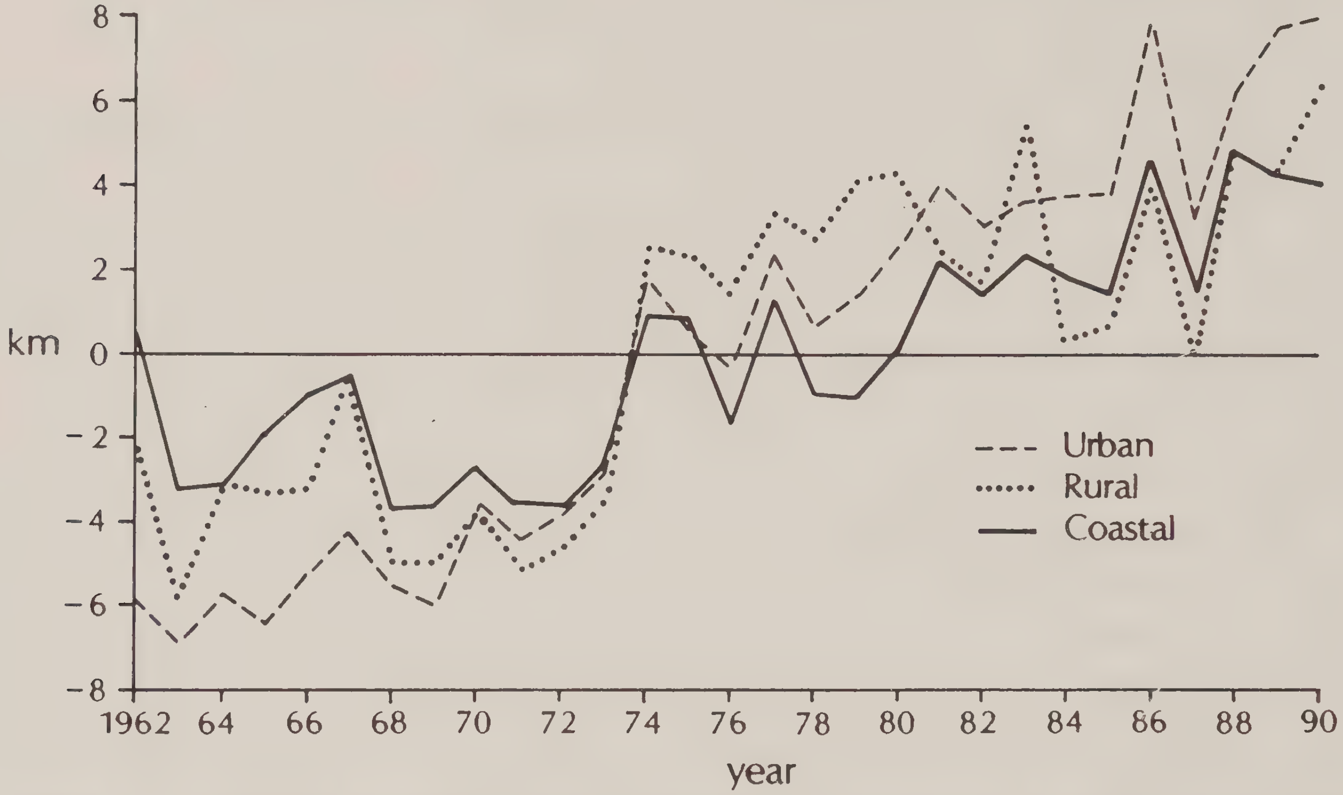

Figure 1. Visibility anomalies (km), expressed as deviations from the 1962-1990 average, for urban, rural and coastal sites

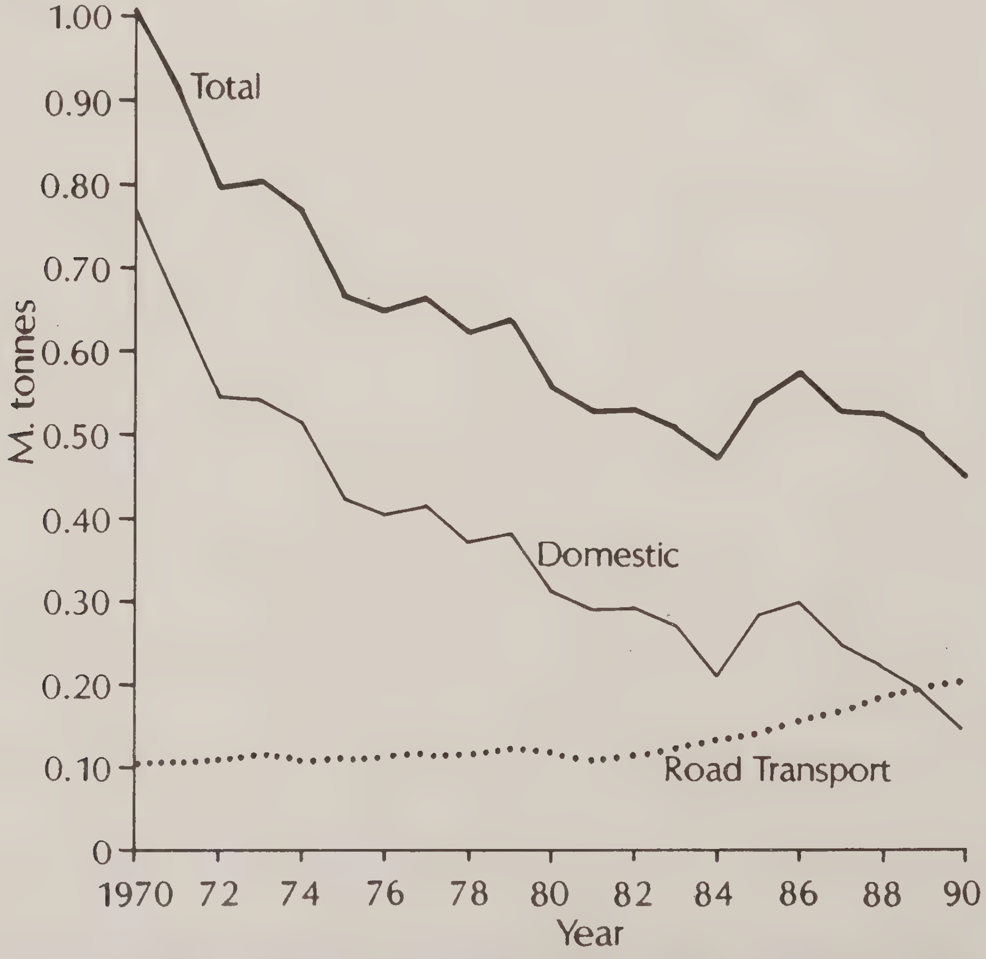

Figure 2. Trends in UK emissions of smoke, 1970-1990. (Source of data, Gillham *et al,* 1992)

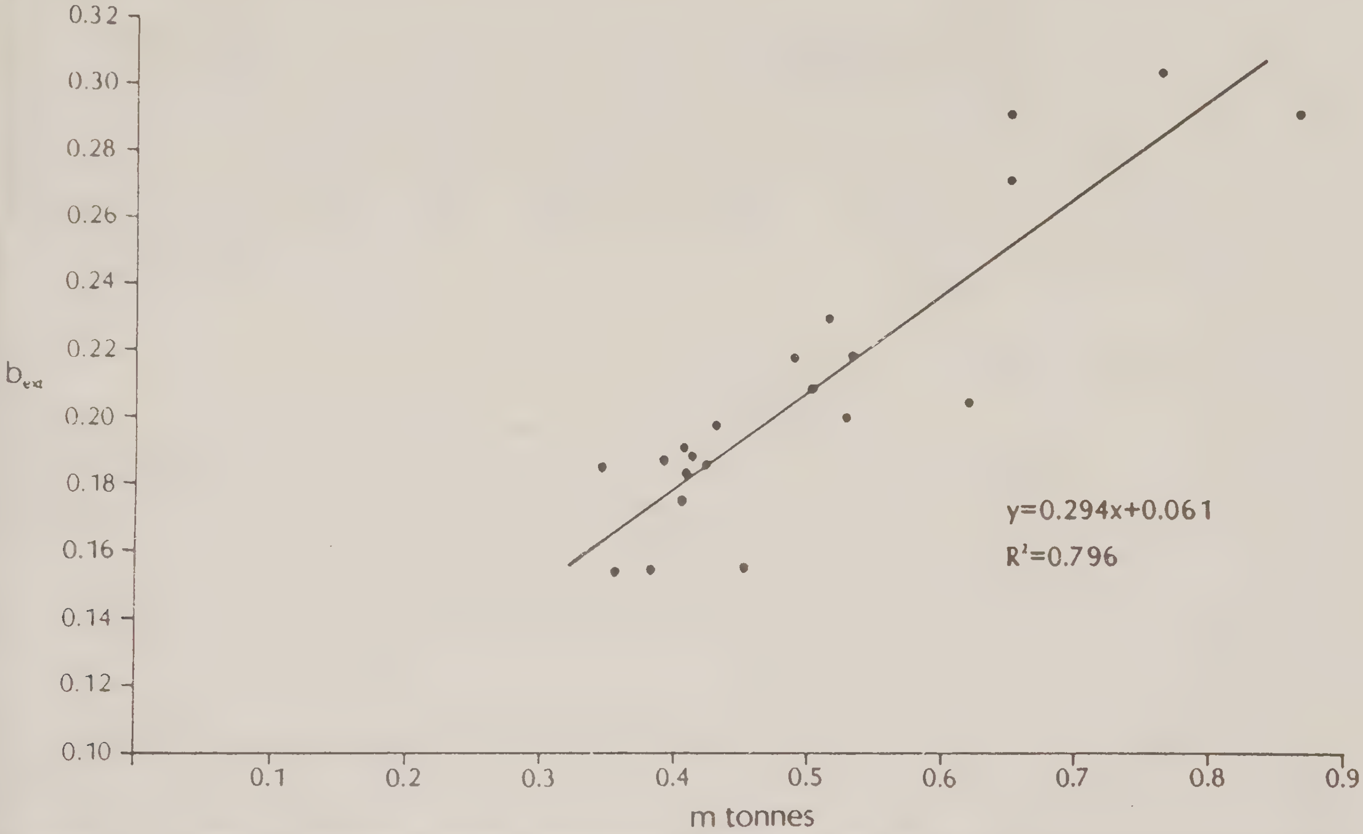

Figure 3. Mean annual urban extinction coefficient (b_{ext}) as a function of annual smoke emissions from domestic and motor vehicle sources for the period 1970-1990. (Source of air pollution data, Gillham *et al,* 1992)

CAN BRITAIN AFFORD TO WASTE MUNICIPAL WASTE AND CONTINUE TO MAKE AN UNJUSTIFIED CONTRIBUTION TO THE GREENHOUSE EFFECT?

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Introduction

In 1990, three papers were published relating to the emission of methane from municipal waste on landfill sties. They were by Munday(1), Lees(2) and Manley(3). Recently, a publication by Marlowe(4) drew attention to the UK Inventory and the wide discrepancy between the results reported in the papers by Munday and Manley on the emission of methane from landfill sites. Munday reported 720 kt/a whereas Manley reported 1980 kt/a.

The latter figure indicated, as was also reported by Lees with 3210 kt/a, that the emission of methane was far greater from landfill sites than from the next major sources of methane in the UK, animal husbandry 1204 kt/a and coal mines 990 kt/a.

This report compares the data used in the above three reports published in 1990 and assesses the reasons for the different conclusions. Taking into account the most accurate assessment of methane emission from landfill sites and the latest information on the quantity of municipal waste being sent to landfill, suggestions are made of actions which could be taken in Britain to reduce the major contribution to the greenhouse effect of landfill gas and to utilise the potential heat in municipal waste, thus conserving fossil fuels.

Study of the Data used in the Reports

The reports were prepared for different purposes and this is taken into account when the three reports are compared. It is assumed that the terms "refuse" used by Munday and "municipal waste" used by Lees are synonymous. The carbon content of municipal waste is 24 per cent based on its ultimate analysis whereas Munday suggests that refuse has 15 per cent potentially biodegradable carbon. The reports by Lees and Munday both indicate that, at the time the reports were prepared, the quantity of refuse or waste sent to landfill sites was 30,000 kt/a.

It is understood that the report prepared under the authorship of Manley was carried out for the Energy Technology Support Unit (ETSU) and the objective was to estimate the size of the 'recoverable' resource associated with landfill gas. The forecast was derived from the estimated tonnage of waste in place in 1987 and did not include sites smaller than about 200,000 tonnes, nor did it include the generation of methane before and after the peak generation period (15-20 years).

(a) The Quantity of Municipal Waste sent to Landfill

Munday and Lees agreed, 31,000 and 30,000 kt/a respectively but the quantity reported by Manley was lower, 25,000 kt/a.

(b) The Output of Landfill Gas per tonne of Refuse

It was calculated that Munday used an output of LFG of 70 m^3/t refuse. This was less than one-third of the emission output used by Lees and Manley. It accounts for the very low methane emission reported by Munday.

(c) Composition of Landfill Gas

It is usually accepted that LFG contains about 60 per cent methane and 40 per cent carbon dioxide. This ratio was used by Lees. When LFG is extracted from landfill sites and used for heat generation, extraneous air is also included. Manley has taken this factor into account and uses 50 per cent methane in the emitted gasses. Lees was interested only in the neat LFG emitted to the atmosphere.

The Quantity of Methane emitted from Landfill Sites

It was concluded that the emission of methane resulting from the deposition of some 30,000 kt/a of municipal waste on landfill sites was of the order of 2000 kt/a (Manley) to 3000 kt/a (Lees) and that Munday's estimation of 750 kt/a was far too low. The Manley estimation was lower than the Lees estimation because his objective was to consider sites suitable for *utilisation* of the LFG by extraction and then combustion with heat recovery. He ignored small sites which were unsuitable for this method of utilisation and also he did not take into account the LFG generated before and after the peak generation period which was emitted to the atmosphere. For a comparison of calculations in the three reports see Table 1.

Table I: Greenhouse Effect of Emissions form Landfill Sites — Comparison of Calculations

	MUNDAY	**LEES**	**MANLEY**
	WSL R764	*NSCA*	*ETSU B1192*
	1990	*1990*	*1990*
Municipal Waste to Landfill kt/a	31,000	30,000	25,000
Output of LFG from refuse m^3/t	---	250	222
Composition of LFG % CH_4	50	60	50
Tonnes CH_4 / tonne refuse	.025	.11	.079
Yearly LFG Emission $10^9 m^3/a$	---	7.50	5.57
Yearly CH_4 Emission $10^9 m^3/a$	1.00	4.50	2.78
Yearly CH_4 Emission kt/a	720	3210	1980
Assuming that the effective ratio of CH_4 to CO_2 on the greenhouse effect is 15:1(5)			
Annual greenhouse effect of LFG			
expressed as million m^3 CO_2 is	15,000	67,500	41,600
expressed as million tonnes CO_2 is	30	132	82

The three reports were published in 1990. Further information has since been received. *Waste Disposal Statistics 1993* for England and Wales prepared by the Chartered Institute of Public Finance and Accountancy (CIPFA) show that in 1989-90 the quantity of municipal waste was 36,900 kt/a and in 1991-92 was 37,100 kt/a. This data does not include Scotland. Even without Scotland, it is an appreciable increase on the maximum data used for the UK in the three reports, 30,000 kt/a.

An even higher quantity of municipal waste of 50,000 kt/a is included in a DTI Report to the President of the Board of Trade, November 1992, Energy Paper No. 60 from the Renewable Energy Advisory Group which states:

> "About 25 million tonnes of household waste and 25 million tonnes of combustible commercial and industrial waste are generated in the UK each year. Household waste has an energy content of around 9 GJ/tonne and commercial waste around 16 GJ/tonne (as compared with coal at 27 GJ/tonne). The total energy content of the collected waste is therefore around 23 million tonnes of coal equivalent per year (620 PJ/year)".

The Greenhouse Effect of the Methane emitted from Landfill Sites

The greenhouse effect of the methane emitted from municipal waste sent to landfill sites was also included in the Report by Lees. All the available data on the greenhouse effect is open to controversy but it is considered that the best available estimation of a comparison of the greenhouse effect of equal volumes of methane and carbon dioxide in the stratosphere is that given in a Watt Committee Report(5). An equal volume of methane has 10-20 times the effect of carbon dioxide. A ratio of 15:1 was used in the preparation of the Table for this report.

Clearly, the quantity of methane emitted from municipal waste sent to landfill in the UK is now at least as high as in the Lees report and probably considerably higher.

In addition to methane, carbon dioxide is present in landfill gas and this makes an additional, although comparatively small, contribution to the greenhouse effect. This contribution is equivalent to some 5 per cent of that of the methane from the landfill gas.

Lees made a comparison of the greenhouse effect of the annual emission of methane from landfill sites with the effect of oxides of carbon emitted from transport and power stations in the UK shown in Figure 1(2). The latest data, 1993, on the quantity of municipal waste sent to landfill each year suggests that the contribution from landfill is now considerably higher than shown in this Figure. It is much higher than the contribution of oxides of carbon from transport and probably more than 80 per cent of the effect of carbon dioxide emitted from all the power stations in the UK.

Also shown in Figure 1 is the percentage of domestic waste incinerated in modern developed countries based on information supplied by Warren Spring Laboratory in 1989(6). The percentage incinerated in Britain is now extremely low, well below 5 per cent. If we introduced energy from waste schemes with incinerators complying with the EC Directive relating to pollution, we could effectively dispose of at least half of our annual production of municipal waste in this manner and halve emissions of landfill gas with a corresponding reduction in the associated greenhouse effect.

The calorific value of municipal waste is one-third to one-half that of coal so that the introduction of these schemes to utilise 50 per cent of municipal waste would correspond to a saving of some 10,000 kt/a coal equivalent for power generation or CHP Schemes.

As a first step towards this objective a modern energy from waste scheme for South East London is in course of construction and is planned to be operational early in 1994. It will conform to the latest EC Directive. Other plant, such as at Edmonton and Coventry, are to be upgraded to meet the EC Directive and others, such as schemes for Belvedere and Northfleet, are at the Inquiry stage.

Many more energy from waste schemes with capacities of, say, from 250 kt/a to 1500 kt/a of waste are required to enable Britain to approach the high standards achieved in other developed countries. Even the US with its large population and extensive land area planned to incinerate 20 per cent of its municipal waste and utilise the heat generated by the end of 1992.

Recommendations

The disposal of municipal waste is a national issue and should be dealt with on a national basis, particularly as the capital cost of equipment for efficient energy from waste schemes is high.

Action is required from government departments, that is the DOE and DTI, to kick-start the programme. Measures which should be included could be:

a) Decide where it would be best to install the plant in cooperation with local authorities to match areas of high population density. As examples, it is anticipated that London might require another four schemes in addition to those mentioned above and the Manchester and Birmingham areas might each require two schemes. Smaller towns or centres of population would require one scheme.

b) Initiate methods for raising the necessary finance for the introduction and construction of the schemes which must always be installed to satisfy BATNEEC and to meet the technical requirements of the EC Directives. It is anticipated that the NFFO will continue in some form for energy from waste schemes beyond the end of 1998.

c) Collected municipal waste will generally go directly to the incinerators and reduce the need for waste transfer stations where these schemes are introduced. In many cases the distance of transport of waste will be much reduced. Further, the separation of waste paper and plastics may not be justified in areas with energy from waste schemes as the potential energy will be of more value than that of recycling. At present, more paper is being collected than the capacity of the recycling equipment. Collection of waste paper and plastics should be encouraged in areas other than those with energy from waste schemes and separation of glass and metals should be vigorously encouraged in all areas.

d) The Institution of Mechanical Engineers, the Institute of Energy and the NSCA have all held conferences or seminars on energy from waste. A seminar, "Energy from Waste, Clean Green and Profitable" was recently held in London(7) by the Institute of Energy where the initiation and development of the SELCHP scheme was the main topic. It is planned to have a similar seminar in the Winter Session 1994-95 when the main topics will include the construction of and operating experience with the SELCHP scheme and future developments of related schemes.

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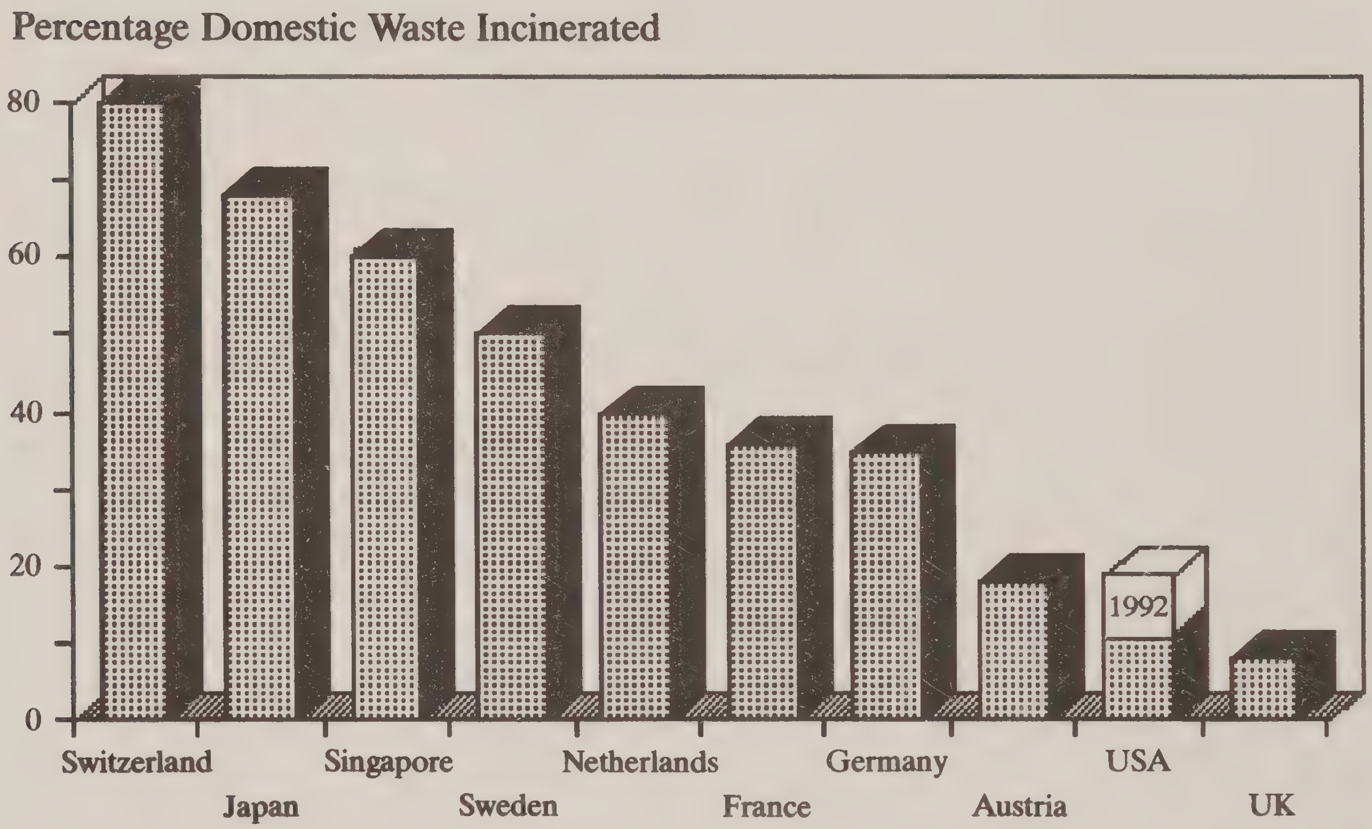
Percentage Domestic Waste Incinerated
80
60
40
20
0
1992
Switzerland
Japan
Singapore
Sweden
Netherlands
France
Germany
Austria
USA
UK

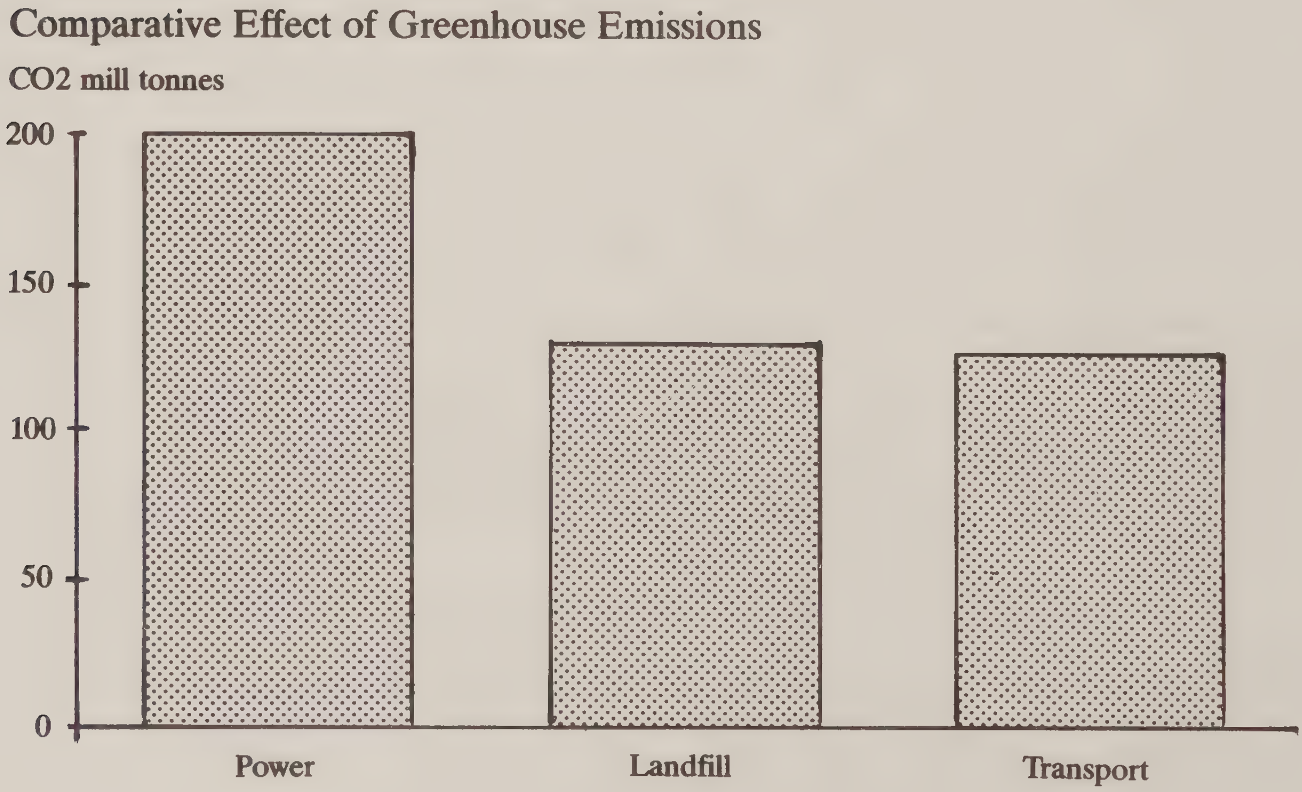
Comparative Effect of Greenhouse Emissions
CO2 mill tonnes
200
150
100
50
0
Power
Landfill
Transport

Figure 1

UPDATE

LANDFILL LEVY

In the 1992 Environment White Paper, *This Common Inheritance: The Second Year Report*, the Government indicated that it would make a presumption in favour of using economic instruments rather than regulation to achieve environmental objectives. As part of this programme of work exploring the use of economic instruments in environmental policy, the Department of Environment commissioned a report from Coopers & Lybrand on *Landfill Pricing: Correcting Possible Market Distortions.* Their report, published in February, examines current and projected waste disposal costs, assesses the impact of introducing a levy on waste going to landfill, and considers ways of implementing it.

Coopers predict that the price of landfill will increase by between 37 per cent and 135 per cent before the year 2000 with prices ranging from £11 to £47 per tonne. This will be primarily a response to tighter development controls and more stringent licensing requirements. The cost of incineration is expected to settle at about £20 to £25 per tonne as the older and cheaper facilities close because they are unable to satisfy environmental regulations. If the Non-Fossil Fuel Obligation was removed incineration costs would probably be £5 to £10 higher. Their estimates of recycling costs vary from £16 to £36 per tonne for Bring systems to £85 to £175 per tonne for Blue Box kerbside collection systems.

Coopers & Lybrand conclude that the introduction of a levy would be feasible; the main effect, in the longer term would be to increase the incentive to send waste to incinerators rather than landfill, but it would also make materials recycling more commercially attractive.

Landfill Pricing: Correcting Possible Market Distortions is available from HMSO (ISBN 0-11-752730-0), priced £12.

LAND POLLUTION

Following their decision not to go ahead with registers of contaminated land, the Government has decided instead to carry out a wide-ranging review of the problems in this area. The review will be conducted by an interdepartmental group of officials under the Chairmanship of the DoE and will seek contributions from interested parties. Its terms of reference will be as follows:

"To review the powers and duties of public authorities which relate to the identification, assessment, and appropriate treatment or control of land that could cause pollution of the environment or harm human health, having regard to the need to minimise the costs which existing and new regulatory burdens place on the private sector; to consider the mechanisms for recovering authorities' costs in controlling or remedying pollution of such land sufficient to ensure its safety for health and the environment, and its return to beneficial use where practicable; to consider the implications of these for the role of the Environment Agency; to report initially on any statutory changes needed in the short term and on the scope of any longer term studies that should be put in hand; and to undertake and report on those studies."

No timetable for the group's work has been given.

IPC GUIDE

A revised version of the Department of Environment/Welsh Office's *Integrated Pollution Control — A Practical Guide* is now available from HMSO, price £4.50. The main changes relate to the description of BATNEEC, particularly in relation to applying this to new processes. In the new Guide emphasis is placed on the degree of environmental damage which a process could cause, which could thus result in a greater cost in terms of "Best Available Techniques" before this was considered excessive. The new Guide also says that "lack of profitability of a particular business should not affect the determination" of BATNEEC.

IPC FEES AND CHARGES

HMIP has increased its fees and charges for 1993/4 for administering IPC by only a small amount. The new charges which applied from 1 April 1993 are (1992/3 figures in brackets):

- Application fee, per component — £3,750 (£3,650); for processes previously regulated under *Alkali Act* — £2,500 (£2,450);
- Variation fee — £1,250 (£1,200);
- Annual subsistence charge, per component — £1,540 (£1,500);

The supplementary charge, arising from the underestimating of costs for the year 1991/2 and which applies only to processes authorised then is unchanged at £610 per component (or £410 for processes previously regulated under the *Alkali Act*).

AIR POLLUTION FEES AND CHARGES

The Department of Environment has also announced the fees and charges to be applied by local authorities in controlling air pollution under the EPA for 1993/4 (1992/3 figures in brackets). As with HMIP charges for IPC, increases have been kept to the minimum.

- Application for authorisation £935 (£900). No increase for processes previously registered under *Alkali Act* (£580) or where process comprises one or more small waste oil burning appliance (£100);
- Substantial changes £600 (£580). Where the substantial change is due to implementing upgrading plan a charge of £100 will apply. No change for waste oil burners (£65).
- Annual subsistence charge £570 (£550). Again no change for waste oil burners (£100).

N. IRELAND AIR POLLUTION CONTROL PROPOSALS

The Northern Ireland Environment Department has finally published its proposals for a new system of air pollution control in the Province. Processes in N. Ireland are currently regulated under the *Alkali & Works Regulation Act 1906* and subsequent regulations.

The substances to be prescribed are the same as for the rest of the UK but as the vast majority of processes in N. Ireland only emit to air, two tiers of air pollution control are proposed: major polluters (Part A processes) would be controlled by a Chief Inspector to be appointed by the Department; those processes (Part B) with less potential to cause air pollution would be controlled by the District Councils. The consultation paper says that structures already exist within the Department to take account of IPC.

The proposed new control system is similar to that applying in England, Scotland and Wales. Processes would be required to apply for an authorisation; these would have to show how BATNEEC was to be applied and to show that EC Directives etc are being met; applications would be required to be advertised in local newspapers and copies of applications, authorisations etc would be held on a public register. There would be a right of appeal to the Environment Department against decisions of the enforcing authorities.

Existing processes registered under the *Alkali Act* will be given initial deemed authorisation by letter with full authorisations for Part A and Part B processes phased in over a number of years. New or substantially changed processes would need to apply for immediate authorisation. A charging scheme will be introduced to cover the enforcing authorities' costs for authorisations, inspections and enforcement.

Copies of the consultation document are available from the Department of Environment for N. Ireland, Calvert House, 23 Castle Place, Belfast BT1 1FY. The closing date for comment is 28 May.

EMISSION MONITORING

A training package on emission monitoring under the *Environmental Protection Act 1990* has been developed by the Institution of Environmental Health Officers and Warren Spring Laboratory.

Part One of the EPA requires that, under the air pollution control regime, emission concentration limits are closely monitored in order to ensure compliance with the law. The package developed by the IEHO and WSL gives clear guidance on monitoring to local authorities, consultants and industry. The four year package consists of three volumes covering general aspects and methods of monitoring and measurement protocols, an introductory seminar to be held in October 1993 and annual regional training courses to update practices and procedures.

The whole package costs £300 per annum. As an introductory offer, local authorities can subscribe to the package for £250. Enquiries should be made to Publications Department, IEHO, 16 Great Guildford Street, London SE1 0ES, tel: 071 928 6006. Cheques should be made payable to Chadwick House Group Ltd.

ENVIRONMENTAL SCIENCE & TECHNOLOGY

Laboratories specialising in environmental science and technology in six EC Member States have formally established the European Network of Environmental Research Organisations (ENERO). In addition to the UK's Warren Spring Laboratory, other founder members represent Spain, Ireland, France, Germany and The Netherlands. Initially membership of ENERO will be limited to one organisation from each EC Member State which undertakes practical research into environmental science and technology, and which is either in the public sector or works primarily for the public sector.

ENERO's main objectives are

- to help laboratories sharing similar objectives to know each other better in order to create a synergy and to avoid duplication of work and facilities; and
- to develop collaborative proposals on topics of international interest to both the public authorities and industry.

These objectives will be achieved through information exchange on research, coordinating programmes and developing common programmes. Members will also share research facilities.

Six areas have been agreed for initial activity: Rio conference mission; product lifecycle analysis; data harmonisation (to be coordinated by WSL); environmental auditing; environmental training cycle; and influence on the aquatic environment of accidental pollution.

GAS LEAKAGE CONTROL

British Gas has completed the most comprehensive leakage survey on a gas distribution system ever undertaken anywhere in the world. The results show a leakage rate of around one per cent of throughput. With information gained through the survey British Gas is now able to develop a planned programme of further leakage reductions which bring financial gains as well as safety and environmental benefits to the community.

The tests involved isolating 574 sections of gas mains and connected services in all parts of the country. Each section tested was around 100 metres in length with services to individual properties connected. Pressure testing was carried out on the main itself, on individual services and on the section as a whole.

The identification of leakage is important to British Gas in terms of safety, lost revenue and environmental impact because of the characteristics of methane as a greenhouse gas. The company invests more than £250 million a year in improving the gas distribution system, backed by developments in research and technology. That includes the replacement over the past 10 years of around 20,000 miles of mains and more than four million individual services within the gas distribution network, primarily on grounds of safety, using leak-free plastics and welded steel. Leaks from gas pipes are a relatively minor source of the methane that gets into the atmosphere, accounting for less than 10 per cent. Other sources are livestock (38 per cent), rubbish tips (24 per cent) and coal industry (18 per cent).

As a result of the recent tests British Gas is now able to pin-point more precisely leakage criteria within the system. It is drawing up a programme with the aim of achieving further leakage reductions of at least three per cent a year over the next few years.

SMOKY VEHICLES

A parliamentary question from Mr Elfin Llwyd (Plaid Cymru) concerning action taken in response to complaints about smoky vehicles elicited the following response from Under Secretary of State, Kenneth Carlisle:

"Since April 1991 the vehicle Inspectorate has asked some 3,000 vehicle operators to check vehicles for excessive smoke, following complaints. Most operators have responded positively to these requests and have taken steps, where appropriate, to remedy defects. A follow-up vehicle inspection has only been necessary in a relatively few cases. I am not aware of any complaint which has resulted in the issue of a prohibition notice or action against an operator's licence. A vehicle would be inspected at a testing station only if that were necessary to clear a prohibition."

VEHICLE EMISSIONS AND CATS

A new report for WWF by Earth Resources Research has concluded that more work needs to be done on reducing the length of time it takes for a catalytic converter to become effective if VOC and CO emissions are not to start rising again as cars with cats begin to dominate car fleets.

Currently catalytic converters take a few minutes to warm up and as about 60 per cent of car journeys are less than 5 miles (8 km), they account for nearly half of all CO and VOC emissions from cars. ERR estimate that about 70-80 per cent of CO and VOC emissions from a car equipped with a catalyst occur during the first kilometre. As approximately 26 per cent of car journeys are less than about 3 km (2 miles), more needs to be done to encourage people to use alternative (non-polluting) modes for such journeys.

RADIATION EMERGENCIES

The Health & Safety Executive has published Guidance for companies and local councils on compliance with the *Public Information for Radiation Emergencies Regulations 1992* (available from HMSO, price £5.00). The Regulations require companies carrying out an activity which could possibly result in a radiation emergency to prepare and disseminate information to all members of the public within a certain radius as to what action they should take in the event of an emergency. County and Regional councils must also ensure that they are in a position to give affected members of the public prompt and appropriate information covering the facts of the emergency and health protection measures.

WASTE GUIDELINES

Reducing the Burden of Waste — Guidelines for Business", published by the CBI in its Environment Means Business series, points out that the cost of waste disposal is as big a burden on the environment as on business and that carefully designed waste minimisation strategies can save companies millions of pounds. Guidelines cover issues such as waste minimisation, management commitment and staff involvement, waste disposal, operating practice, investment in new technology, separation of waste streams, targets, priorities, reduction, monitoring and communicating progress. (Available from CBI Publication Sales, 103 New Oxford Street, London WC1A 1DU, price £5.00 for non-members).

ENTERPRISE AND THE ENVIRONMENT

This Open University course is one component of the Manufacturing Management and Technology Programme and explores active environmental management as a business opportunity. It emphasises the way companies can work together to their mutual benefit and recognises the trend towards integrating enterprise with environment. It also aims to give guidance to managers snd technologists on how they can improve their company's environmental performance.

Block 1 of the course explains why environmental concerns are important; block 2 what can be done (e.g. efficient use of energy and materials); and block 3 how to do it (e.g. environmental auditing techniques). The course programme is flexible enabling students to construct their own certificate, diploma or masters qualification.

AIR QUALITY IN BATH

Bath City Council's annual air quality report 1992 shows that reducing pollution from road vehicles still represents the major challenge for the next decade. It suggests that further local initiatives, such as park and ride schemes, cycle routes and improved public transport, are needed to reduce non-essential traffic using the central area.

Copies of the full report with monitoring results for smoke and SO_2, airborne metals, NO_2, CO, ozone, benzene and radon, grass pollen and radiation are available price £5 from Mrs. I. Elliott, EH Section, Bath City Council, Abbey Chambers, Bath BA1 1NT.

BOOKS AND REPORTS

AIR POLLUTION ENGINEERING MANUAL

Ed A.J. Buonore, W.T. Davies, AWMA, Chapman Hall, 1992. £72.50. ISBN 0442008430.

Written by experts in the air pollution control fields, the manual covers emissions and control technologies for a wide range of pollutants and industries.

THE WORLD ENVIRONMENT 1972-1992
Two Decades of Challenge

Ed M.K. Tolba et al, Chapman Hall, 1992. £65.00. ISBN 0412470004.

An analysis of the response of the international community to the changing world environment since the Stockholm Conference in 1972. It is divided into four sections which look at the issues, causes and consequences, responses and future scenarios. It assesses the progress made in combating environmental degradation and the areas of environmental conservation that have been neglected.

ENVIRONMENTAL LAW IN SCOTLAND

Ed C.T. Reid, Sweet and Maxwell, 1992. £30.00. ISBN 0414010221.

This book aims to provide an introduction to Scottish environmental law by presenting an all round picture of the key aspects of environmental control. It includes chapters on air, water, waste, planning, noise and integrated pollution control, each written by a specialist in the subject area and provide a useful overview of Scottish Environmental law.

BIOTECHNIQUES FOR AIR POLLUTION ABATEMENT AND ODOUR CONTROL POLICIES

Ed A.J. Dragt, J. van Ham, Elsevier 1991. $188.50. ISBN 04489263X.

An overview of recent developments in biological techniques for air pollution control, as presented at an international symposium in 1991. It describes in detail processes for the prevention of odour nuisances and reduction of odour emissions as well as process design, equipment construction and policy measures.

RETHINKING THE ENVIRONMENT

R. Lewis et al, Adam Smith Institute, 1992. £40.00. ISBN 873712227.

The thoughts of fifteen academics in the environmental economics field are brought together, in a reassessment of our approach to controlling environmental pollution. Their treatises argue that capitalism can be good for the environment and that private ownership protects — "People will protect the planet more keenly if it is in their direct interest to do so." An interesting assessment of the way in which market mechanisms could be used to protect the environment.

SOLVENT SUBSTITUTION FOR POLLUTION PREVENTION

US Department of Energy / US Air Force, Noyes, 1993. US $48.00. ISBN 0815513194.

This book provides up to date information on current technologies and practices in solvent substitution for those handling, using or managing solvents. It covers a wide range of uses including paint stripping, coating, printed circuit boards and metal finishing.

EXHAUST EMISSIONS AND MOTOR VEHICLES

A. Watts, J. Devine, Institution of Mechanical Engineers, 1992. £27.50. ISBN 0852988397.

A sourcebook listing specialist information on exhaust emissions, engines, fuel, air quality and research and development. It covers databases, journals, training and regulations, with over 250 technical references.

RISK ANALYSIS, PERCEPTION AND MANAGEMENT

The Royal Society, 1993. £15.00. ISBN 0854034676.

Scientists, engineers and social scientists have been brought together to produce this contribution to the ongoing debate on risk assessment. Building on the Royal Society's 1983 Study Group Report on Risk Assessment, its objective is to provide guides to decisions on priorities for action. Risks from transport, employment, sport, radiation, smoking, food and HIV are compared. The importance of public perception is demonstrated by the social scientists and experience in other countries is used for comparison. Six chapters look at different aspects of the subject, with an appendix giving costs and benefits of risk reduction.

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Suzanne Couling, Warren Spring Laboratory, UK

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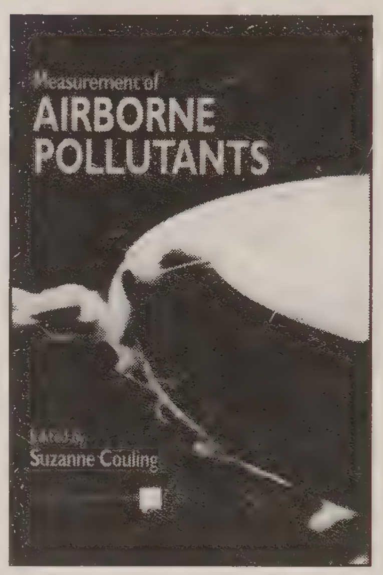

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NITROGEN OXIDES CONTROL TECHNOLOGY FACT BOOK

L.L. Sloss et al, Noyes Data Corporation, 1992. US $86.00. ISBN 0815512945.

International technologies for the control of NOx emissions, primarily coal combustion, are described and more than 115 control systems documented, along with general information on emissions.

METHODS FOR DETERMINATION OF INDOOR AIR POLLUTANTS
EPA Methods

W.T. Winberry et al, Noyes, 1993. US $89.00.ISBN 0815513143.

A compendium of methods to provide environmental agencies with specific guidance on the analytical determination of indoor air pollutants.

THE EARTH SUMMIT

S. Johnson, Graham & Trotman, 1993. £78.00. ISBN 1853337846.

An account of the inception, development and outcome of the United Nations Conference on the Environment. This book contains the full text of the conventions and declarations of the conference, Agenda 21 and significant ancillary documents. Each text is supported by a full analytical commentary, providing a comprehensive guide to the Earth Summit.

WISDOM'S LAW OF WATERCOURSES
Fifth edition

W. Howarth, Shaw & Sons, 1993. £35.00. ISBN 0721900836.

This updated edition of a standard text provides a very readable and informative guide to water legislation. It covers all aspects from definitions of watercourses to international and domestic law and rights to seaweed. With a large chapter devoted to water pollution, the book provides an excellent introduction to the subject. It is current to September 1991, and anticipated developments have been taken into account.

FUTURE EVENTS

10-11 MAY— COMPLYING WITH ENVIRONMENTAL LEGISLATION
A practical course to provide non-lawyers with an understanding of the impact of environmental legislation on their organisations.
Venue: Churchill College, Cambridge.
Details: University of Cambridge, Programme for Industry. Tel: 0223 302233.

10-13 MAY — INTERNATIONAL ENVIRONMENT '93 CONFERENCE

Now in its thirteenth year the event includes some 37 dedicated sessions with some 250 Chairmen and Speakers. A comprehensive academic poster programme will also run alongside the conference over the 4 days.
Venue: Wembley Conference Centre.
Details: Eileen Davies, IE '93. Tel: 0727 855574.

24-25 MAY — INTEGRATED POLLUTION CONTROL — THE LESSONS LEARNT

Whilst IPC is undoubtedly an added expense for many industrialists, the worst fears have proved to be unfounded and the new regulatory framework has settled into a smoothly running operation, protecting the environment and the companies who might otherwise cause its quality to deteriorate. This conference will provide a necessary update on new developments, including the EEC initiative to introduce 'Integrated Permitting' on a community wide basis.
Venue: Hilton, Park Lane, London.
Details: Amanda Wright, IBC Technical Services Ltd. Tel: 071 637 4383.

2 JUNE — REGULATION AND CONTROL OF INDUSTRIAL EMISSIONS OF VOCs AND ODOURS

Parallel sessions will look at conventional abatement techniques and more novel biotechnological techiques more suitable for SMEs.
Venue: 14/15 Belgrave Square, London SW1.
Details: Society of Chemical Industry. Tel: 071 235 3681.

3 JUNE — AVIATION, ENVIRONMENTAL REGULATION AND THE FUTURE: A WORLD-WIDE PERSPECTIVE

Aviation has become a cornerstone of modern life. It produces beneficial effects; airports can be a major catalyst for economic regeneration and employment, and air transport has brought revolutionary and life-enhancing speed and ease to the carriage of goods and people over great distances. A wide range of expertise will review and examine existing and currently developing regulatory frameworks designed to control the environmental and amenity impacts of air transport and general aviation.
Venue: Royal Society of Arts, London WC2.
Details: Airfields Environment Trust. Tel: 071 329 8159.

15 JUNE — INCINERATOR EMISSIONS

BAT and NEEC — Siamese twins or deadly rivals? What can existing technology achieve, do we have to push back the frontiers?
Venue: 14/15 Belgrave Square, London SW1.
Details: Society of Chemical Industry. Tel:071 235 3681.

15-18 JUNE — ANNUAL WASTES MANAGEMENT CONFERENCE AND EXHIBITION — TOWARDS 2000 — THE FUTURE DIRECTION OF WASTE MANAGEMENT

Wastes Management is currently subject to great change, brought about by new

legislation, both domestic and European, and by the increasing environmental expectations of society at large. This year's conference focuses on those changes, taking the opportunity of assessing current conditions and reflecting on likely developments in waste management which will take us forward to the end of the century.
Venue: Festival Theatre, Torbay.
Details: IWM Business Services Ltd. Tel: 0604 20426.

16 JUNE — SUBSTANCES AND PROCESSES DANGEROUS TO THE ENVIRONMENT

Legislation affecting the use of industrial chemicals now requires testing for environmental effects to be carried out prior to placing on the market. Other legislation requires that processes producing pollution are licensed. The meeting aims to examine current approaches to both these areas and to take a view at potential future demands in this developing field.
Venue: Harris Conference Centre, University of Lancashire Preston.
Details: Dr Paul Illing, Health and Safety Executive. Tel: 051 951 3420.

22 JUNE — DISPOSAL OF HAZARDOUS WASTES

This course will review the legal, technical and economic aspects of hazardous waste disposal currently in the UK, but more importantly will critically examine the deficiences of the system in practice. Legal developments coming out of the Environmental Protection Act will be outlined, and the options open to waste producers to upgrade standards and reduce environmental risks will be considered.
Venue: University of Sheffield.
Details: Maria Elliott, University of Sheffield. Tel: 0742 768653

23 JUNE — RISK IN THE LOCAL ENVIRONMENT — SETTING PRIORITIES FOR ACTION

This NSCA development workshop will review the techniques of hazard identification, and risk assessment, management and communication in order to identify the circumstances where their use is appropriate. It will do this by looking at how the techniques have been practised in real situations. The aim will be to demonstrate the underlying priciples and to identify strengths and weaknesses in methodology. The workshop is designed for professionals in the public and private sectors responsible for planning, enforcing or managing environmental protection.
Venue: NEC. Birmingham.
Details: Peter Mitchell, NSCA. Tel: 0273 326313.

5-6 JULY — ENGINE EMISSIONS MEASUREMENT

This two-day course will explain the function of heated on-line gas analysis systems for CO2, CO, O2, UHC, Nox, and SOx measurements from engines and a working system will be domonstrated with data logging onto a computer. The course is aimed at engine emissions measurement personnel and their supervisors.
Venue: University of Leeds.
Details: Julie Charlton, University of Leeds. Tel: 0532 332494.

CLEAN AIR INDEX, VOL 22, 1992

Acid Rain: 73-85, 145-152
Access to Information: 67-69
AGM: 179
Agriculture: 93, 160, 195-199
Air Quality Information: 93
Air Quality Monitoring: 43, 159, 171, 187-189, 233-237, 241
Asbestos: 243

Basel Convention: 90
Bonfires: 162
BS 7750: 86-88

Carbon Dioxide Emissions: 241
Carbon Tax: 22, 123
CFCs: 42
Clay Pigeon Shooting: 94
Community Action Programme: 89
Contaminated Land: 28, 42, 203
Conference: 173-178

Derelict Land: 70
Divisional Reports: 27. 127

Energy: 162
Energy Efficiency: 95, 159, 189, 199
Energy, Renewable: 22
Environment Charters: 43, 209
Environment Protection Agency: 4-11
Environmental Law: 42, 162
Environmental Protection Act: 25, 31-33, 57-62, 190-198
Environmental Reporting: 242

Global Warming: 90, 241

Health: 160, 242

HMIP: 238-240

Indoor Air Pollution: 161, 243

Leaflet Competition: 71

Noise: 18-21, 95, 118, 128, 161
  construction: 95
  domestic: 33, 34-39, 40-41, 43, 94, 161
  monitoring: 211-224, 224-225
  industrial: 21, 72
NSCA/AMA Survey: 26, 57-62, 190-198

Odour: 130-142

Passive Smoking: 243
Planning: 18-21, 22, 69, 121, 205, 207
Pollution Inspectorates: 242
Pollution Tax: 44

Radiation: 24
Radon: 160, 161

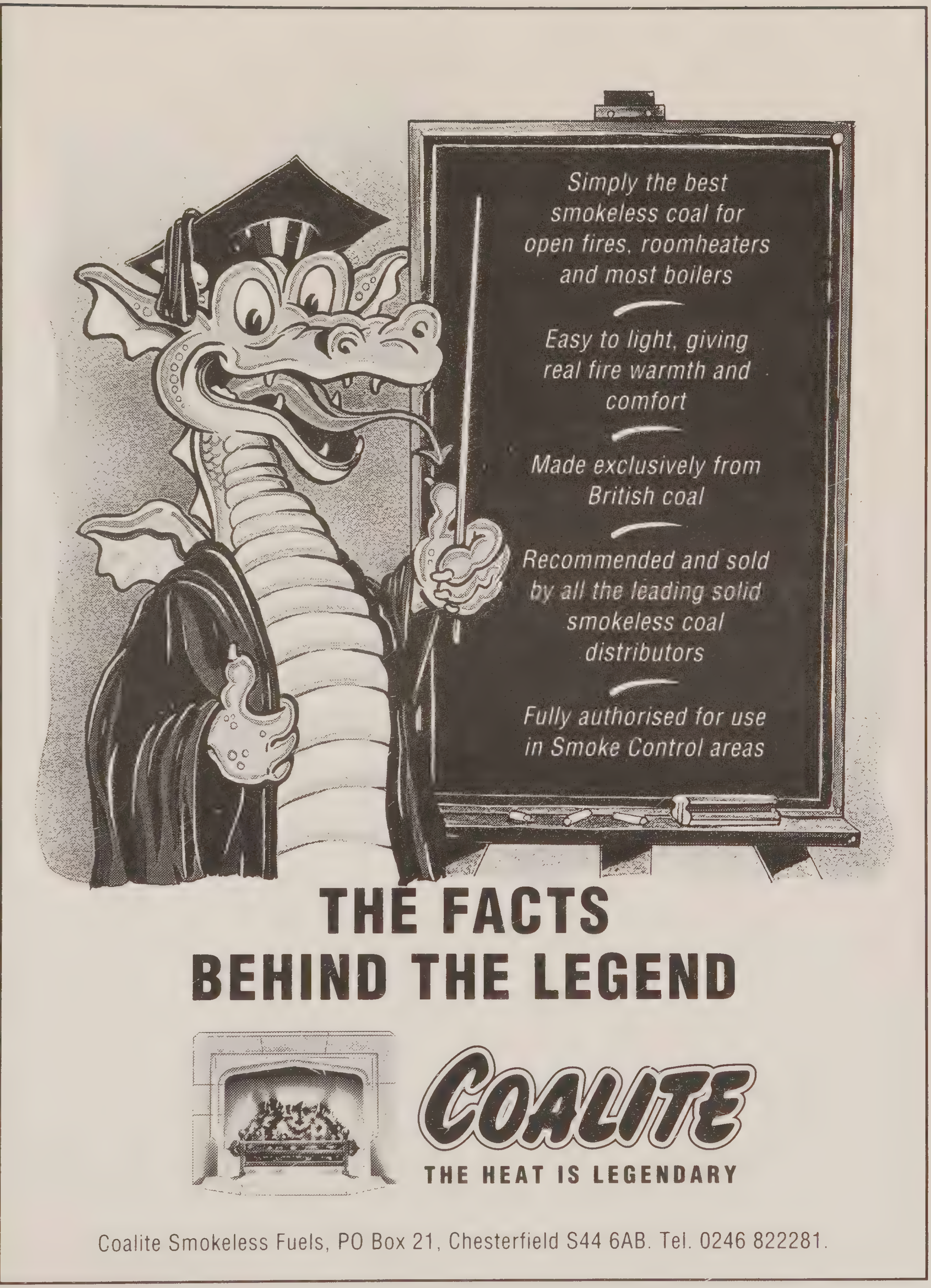
Scottish Division: 10-18, 28, 124-127
Small Combustion Plants Directive: 201-203
Smoke Control: 153
Solid Fuel: 122
Solvent based paint: 92
Stubble Burning: 195-199

Transport: 92, 105
Tourism: 69

Unleaded Petrol: 226-232

Vehicle Emissions: 43, 63-66, 243

Waste: 23, 44, 95, 181-186, 243



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CONTENTS

Editorial 55

NSCA Views
— Warren Spring Closure 57
— NSCA Welcomes RCEP Incineration Report 58
— N. Ireland Waste Management 58
— Draft PPG: Transport 59
— Fitment of Speed Limiters to Buses, Coaches and HGVs 66
— Review of Prescribed Processes and Substances Regulations 68
— Smoke Control:
  Clean Air Grants 70
  Smoke Control Areas 71

NSCA News
— Waste Management: NSCA Spring Workshop 77

Report
— Principles of Environmental Hazard Identification and Risk Assessment: Dr. David J. Ball 81

Update 90

Books and Reports 96

Future Events 101

Advertisers
— Chase Technical Recruitment 80
— Coalite Smokeless Fuels cvr iv

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EDITORIAL

SUSTAINING A COMMITMENT TO THE ENVIRONMENT

The environment is going through one of its periodic downswings, at least if opinion polls and media coverage are to be believed. Over the last few years the Government was happy to respond to green enthusiasm; ambitious plans were launched, challenging commitments were made. Now recession and doubts about the new world order have diverted public and government attention. An alarming gulf between rhetoric and reality is opening at a time when we ought to be linking environmental protection ever more closely to economic and social development at all levels from local to global.

It is just one year since the Earth Summit agreed an agenda for integration of environmental concerns into mainstream decision-making. Back home dis-integration seems to be the order of the day. The cancellation of the Green Bill in favour of an ill-considered deregulation initiative which is questioned even by those which it is intended to help most; the consequent blight of uncertainty about an Environmental Agency; confusion on the way ahead for contaminated land; open warfare between regulators on water quality objectives; postponement of the new framework for waste control; the cavalier breakup of Warren Spring Laboratory; continuing holdups on regulations and codes of practice. . .the environmental landscape in mid 1993 is strewn with the wreckage of good intention.

One initiative which still carries the momentum of Rio is the UK Sustainability Plan; we expect the first draft this month. This is where sustainable development theory should start to turn into concrete reality. The Plan will ask what sustainability means — for transport, agriculture, industry, and so on — and how we might achieve it. The degree to which the Government Departments involved have addressed this question seriously, and come up with realistic indicators and targets for a sustainable future, will tell us much about the real political will underpinning environmental protection.

The Plan will also signal the political will to relax the Whitehall stranglehold. Sustainability means subsidiarity. Just as Whitehall rightly claims that it is better fitted than Brussels for many tasks in environmental protection there are powers which the Mandarins must devolve if environmental protection is to be finely tuned to local circumstances. Many local authorities are looking at their own contribution to sustainable development. Local Agenda 21 initiatives are growing, often bringing together local industry and community groups.

Let us have a National Sustainability Plan which fosters these initiatives by devolution of responsibilities and resources within a framework which recognises that environmental protection, recession and the new world order are connected. At a time when official commitment to the environment is in question, cosmetics will not be enough. We need a real Plan which links a global outlook to local action.

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NSCA VIEWS

WARREN SPRING CLOSURE

Despite much rallying to the support of WSL from both industry and environmental groups, the Government has announced that WSL is to merge with AEA Technology to create a single centre of excellence in environmental technology.

This decision follows the announcement of a wider review of the DTI's five laboratories (including WSL) providing research and technical services to the public and private sectors in the field of environmental technology being carried out by PA Consulting. As a separate exercise, the Minister for Energy has brought in consultants to advise on the practicability of privatising AEA.

In a letter to the President of the Board of Trade, NSCA expressed concern that the review might lead to serious erosion of the science and technology base in key areas of environmental measurement and management presently covered by Warren Spring Laboratory. Maintenance of that base was essential if environmental protection is to be integrated into the economy and society cost effectively during the 1990s and beyond.

NSCA said that it might be argued that industry, individuals and regulators in central and local government can achieve this end working alone. However without a common, coherent science base of adequate size, diversity and scope there is likely to be inconsistency, wasteful duplication in some areas and failure to deal with key issues in others. Centres of excellence within the science and technology base consist of information and experts who are familiar with it. As such they have another important role in sustaining practitioners in industry, regulatory agencies and the consultancies with ideas, information and trained personnel. If centres of excellence such as Warren Spring Laboratory are lost the consequences in relation to this second role will become apparent only in the medium and longer term.

In a further statement NSCA queried whether a single, larger organisation would deliver key services more cost-effectively. Big is not necessarily beautiful, particularly in scientific research. Without careful planning, focused on customer need, there is every chance that the new structure may provide worse value for money.

From the Society's perspective, at a time when there was urgent need to rationalise air quality monitoring and waste management it made no sense to reorganise WSL. The laboratory had shown that it could provide an essential comprehensive and strong science base, with a wide frame of reference. NSCA said that it was important that the full capability was protected during transitional arrangements. Sadly, the reality is that many staff will be made redundant or seek employment elsewhere, leading to a loss of irreplaceable expertise.

NSCA WELCOMES RCEP INCINERATION REPORT – WITH RESERVATIONS

NSCA gave a broad welcome to the Royal Commission on Environmental Pollution's report, *Incineration of Waste* published on 20 May (see this edition of *Clean Air*, Update) but was surprised that the Commission apparently considers incineration of municipal waste to be the best practicable environmental option (BPEO) in all circumstances.

Incineration has often deserved its poor reputation in the past, but the Society believes that the RCEP report will be very influential in swinging public opinion and Government policy in its favour. We particularly welcome the emphasis placed on the contribution of landfill to emissions of greenhouse gases, an area of policy which has so far received inadequate attention.

NSCA has long held the view – reflected in our evidence to the Commission (*Clean Air*, Winter 1991) – that incineration with energy recovery, meeting the new standards required by legislation, will represent the BPEO in many circumstances. The Commission appears to have gone one step further, taking the view that it will prove to be the BPEO in all circumstances. This view may prove less easy to sustain in the face of alternative low-temperature technologies such as accelerated landfill and anaerobic digestion. However, the report should provide considerable reassurance to communities with concerns about proposed incineration projects.

NSCA also welcomed the acknowledgement of a need to integrate waste disposal policy to favour the BPEO, and commented that it was a sad reflection on Government priorities that two key players in this field – Warren Spring Laboratory and the proposed Environment Agency – are both, for different reasons, under threat.

N. IRELAND WASTE MANAGEMENT

Waste management in Northern Ireland is currently regulated by the *Pollution Control and Local Government (NI) Order 1978*; district councils are responsible for the collection, disposal and regulation of waste, for developing a ten year waste disposal plan for their area and for the licensing of private waste disposal facilities.

In response to the changing structure of waste management regulation in the rest of the UK, as well as European Community measures, the Northern Ireland Department of Environment commissioned Aspinwalls to review current waste management practices in the Province. As a result of their review which highlighted a number of priority issues which should be dealt with, the Department has published a consultation document *Future Strategy for Waste Management in Northern Ireland.* This proposes a new legislative system of waste management and is based on Part II of the *Environmental Protection Act 1990.* In separating waste disposal from regulation, it is proposed to develop a centralised waste regulatory body by setting up a new waste inspectorate within the DOE (NI).

In a letter to the Department NSCA expressed doubts over whether the degree of centralisation proposed will match practice to local circumstances as closely as might be possible with a greater degree of devolution. We would prefer to see local choice from a national menu instead of a national set meal.

In commenting on similar proposals for waste management strategy in Great Britain, the Society had argued for a clear separation of the waste regulation function from collection and disposal. In comments on proposals for Environment Agencies in England and Wales, and in Scotland, the Society has argued for a body sufficiently distanced from Government to exercise both enforcement functions and policy assessment in an independent manner. Independence is the key to public confidence. Thus we recommend that a separate Waste Regulation Authority should be given the task of waste regulation and the coordination of waste management policy in the Province. Political priorities will clearly remain within the remit of DOE (NI), and arrangements for liaison with local communities via local authorities will be necessary.

The UK Government is committed to the principle of independent agencies exercising a regulatory role in waste management in Great Britain, and NSCA is of the view that the people of Northern Ireland should not be satisfied with anything less.

DRAFT PLANNING POLICY GUIDANCE TRANSPORT: PPG 13

Planning Policy Guidance notes (PPGs) are advice from the Secretary of State for the Environment to planning authorities. PPGs are not law but have considerable weight in influencing the operation of the planning system, especially when considering draft development plans or local planning appeals. The Draft Planning Policy Guidance note on Transport will replace the existing PPG13, *Highways Considerations in Development Control.* The new note updates and broadens earlier advice in the light of new policy imperatives and the current, higher status of Development Plans.

NSCA welcomes the emphasis which is increasingly accorded to the role of planning guidance in environmental protection policy and supports the generally frank and positive approach used in this draft guidance note. We particularly welcome the encouragement to cater in mainstream budgets and plans for some transport modes which have hitherto been largely considered as fringe activities, and the reinforcement of advice to fully assess the effects of proposals and plans. However we believe the draft to be capable of further development both in its assessment of the strategic context of transport and planning, and in some of the detailed advice on offer. Our comments relate directly to the section headings and paragraph numbers in the consultation paper.

1. Introduction

General comment

The Introduction to the guidance emphasises the important interactions between transport and land use, and the Government's commitment to the principle of sustainable development. However it fails to provide a solid framework which relates planning policy objectives to sustainable development, largely by ignoring an important tier of the policy hierarchy.

The European Community (EC) Fifth Action Programme for the Environment *Towards Sustainability*[1] identifies five main target sectors, including transport. It sets a framework based on environmental targets, and the measures and instruments necessary to achieve them. The EC Green Paper *A Community Strategy for Sustainable Mobility*[2] further elaborates proposals for the Community transport strategy "based on a global approach [which] would promote sustainable mobility by integrating transport into an overall pattern of sustainable development". Specific reference is made to the role of planning in this context.

We consider that as part of the UK's plan for sustainable development the Government should set a number of targets (including air quality and noise as well as other environmental and social factors), evaluate the potential contribution of the measures and instruments available by sector, and produce a plan which aims to meet these targets at minimum cost. The contributions expected from the application of planning policy guidance can then be specified. Important work in the evaluation of the impact of planning on emissions from road transport has already been undertaken in support of this consultation paper, and should be continued.

The Introduction also fails to raise health as an important linked issue, both for the negative effects of emissions, noise and travel-related stress on health, and the positive benefits of walking and cycling.

Specific comments

Paragraph 1.1 of the Introduction defines transport problems as "environmental nuisance and congestion" – a statement which NSCA finds somewhat surprising. The draft PPG lacks detailed analysis of transport's environmental impact, which by any yardstick is more than simply nuisance and inconvenience. Guidance should address transport's share of growing carbon dioxide emissions; local and international air quality; noise and visual disturbance; the amentiy of towns and countryside; and offer a national view of the seriousness of each problem.

Where emission inventories, environmental audits and monitoring programmes identify pollution porblems within an area, the development plan can provide a framework for strategic policies to counter such problems. The three major concerns for this Society relate to carbon dioxide emissions, the impact on local air quality of other transport-related pollutants (oxides of nitrogen, hydrocarbons, carbon monoxide), and noise.

Road transport is the only economic sector where emissions of all the major air pollutants are still increasing. The projected rise in road traffic will offset much of the environmental gain to be made from improved emission standards; current trends promise only marginal improvements in air quality and an inexorable rise in carbon dioxide emissions. Road transport produces emissions at ground level in urban streets and is thus closely associated with direct human exposure. Air pollution from road transport also has effects on crops and natural ecosystems where critical loads are exceeded, and upon the built environment.

As noted above, we believe it appropriate to set national targets for each element of the problem; the guidance fails to repeat the Government's CO_2 stabilisation target, and the likelihood of new targets and air quality standards in the forthcoming EC framework Directive on Air Quality. We trust that the guidance will make appropriate recommendations in the light of developments on the Directive; guidance should remind planners that air quality standards exist and that planning and traffic management will play a part in achieving specified objectives for air quality. Specifically it should mention the value of:

- traffic-flow simulation and prediction models;
- models for prediction of air quality and noise impacts;
- geographical information systems.

The draft does not redress the inadequacies of the draft guidance on planning and pollution. For example, it does not restore the reference set out in DOE Circular 22 of 1984 "Memorandum on Structure and Local Plans" to air quality standards:

> *"In formulating all their policies and proposals, local planning authorities should have regard to. . .European air quality standards. . ." (22/84, para. 4.34).*

This reference went on to suggest that the density of development might be constrained to protect air quality. It is not development as a whole which requires constraint – indeed the DOE/DOT study shows that there are benefits from an increased density of development rather than development elsewhere – but vehicle use. Guidance could usefully set out air quality as one of the reasons to change the basis of urban design (primarily for pedestrians rather than vehicles).

The contribution of transport noise to local environmental quality is reflected in survey figures which suggest that road traffic is the main source, or one source of noise in 62 per cent and 92 per cent of households respectively[3]. Research[4] by the Building Research Establishment suggests that 11 per cent of the adult population of England and Wales is disturbed by traffic noise and 7 per cent by aircraft, and that 7 per cent of dwellings in England and Wales are subjected to noise levels above 68 DBL$_{A10,18h}$ – the level at which highway authorities must offer insulation to householders affected by new road developments. The Report of the DOE Noise Review Working Party (the Batho Report), recommended[5] that this level be reduced – possibly to 65 DBL$_{A10,18h}$ – to reflect changes in social expectations. The EC Fifth Action Programme also sets explicit noise targets for the year 2000. Although we expect the forthcoming PPG on Planning and Noise to cover noise targets in detail, it will clearly be appropriate to deal with the role of planning in meeting environmental quality objectives for transport noise in this guidance.

In commenting that industry, prosperity and essential public services are dependent on an effective transport system, the PPG (para 1.3) also implies that current lifestyles are threatened by changes in the pattern of transport provision. NSCA, however, suggests that guidance should not seek to protect existing lifestyles but note that policy options which appear to limit access for some may generate lifestyle improvements for others. For instance research which examines the neighbourly contact of those living on busy and less busy streets shows that although travel may join individuals, traffic cuts them off from each other[6]. Changes in lifestyle are inevitable as society develops; if we are to reach an acceptable accommodation between transport provision and other social, economic and environmental objectives, changes in lifestyle may be necessary for some but on balance quality of life for all should be improved. Government should develop more specific guidance on how to evaluate the lifestyle implications of particular schemes.

It is hard to find any support for the assertion that the growth in road transport is "benefitting some parts of the environment". Some parts of society and the economy undoubtedly benefit, but not the environment.

The Government believe that increases in tax differentials and the use of appropriate pricing mechanisms in the transport sector could play a part in reducing carbon dixoide emissions; taxation incentives can encourage motorists to buy more fuel efficient cars (para 1.10). NSCA, whilst supporting the reference to the use of pricing mechanisms points to research on the price elasticity of demand for automotive fuels which suggests that the assertion that a 3 per cent real annual rise in petrol costs will provide a "strong" incentive for motorists to conserve fuel is unduly optimistic.

We support the assertion (para 1.11) that urban congestion must be tackled by demand management and provision of acceptable alternative modes. However from the perspective of environmental protection, reducing congestion is not itself a primary objective. If some vehicles are left at home others will replace them — congestion will find its own level as travellers perceive the alternatives to be better or worse. Congestion is not always a bad thing, for example, by slowing down vehicle speeds it will reduce the emission of some pollutants, but increase emissions of others. There is a need for further research into the relationship between congestion and air pollution, and the capacity of traffic management to influence emissions.

The PPG should recognise that the problems of severance and disturbance are not confined to urban areas. In many parts of the countryside, particularly in National Parks and Areas of Outstanding Natural Beauty, congestion is caused by visitors' cars on narrow country roads. Advice on the scope for demand management measures in rural areas would also be appropriate.

The draft PPG says that local authorities are best placed to decide on the mix and balance of measures appropriate for their areas for reducing the environmental impact of transport in towns and cities (para 1.14). NSCA welcomes the concept of the "package approach" enabling local authorities to switch resources between different forms of transport flexibly to achieve an appropriate balance of measures in transport provision. We further commend this as a model for national policy, which currently lacks such flexibility.

2. Influencing the Need to Travel and Choice of Modes

General comment

We welcome the view that local planning authorities, through locational polices in

Development Plans, can help to reduce the need to travel, encourage the use of more energy efficient modes of transport, and reduce congestion. The emphasis on design of development to encourage public transport, cycling and pedestrian provision is also welcomed.

Specific comment

We welcome the reference in para 2.6 to the needs of vulnerable groups, such as the elderly, the disabled and people with young children. Further reference should be made to the needs of children as users of transport services. A considerable proportion of peak-hour traffic comprises parents ferrying children to school, and children are often driven to out-of-school leisure and sports activities. The perception that alternative transport modes — walking, cycling or public transport — are unsuitable for unaccompanied children from the viewpoint of safety or convenience should be addressed explicitly.

In noting that a high proportion of travel is local (para 2.15), the PPG suggests that planning policies should pay more attention to the type of facilities which would encourage people to leave their cars at home, such as safe and convenient access for pedestrians and cyclists; location of a range of services and facilities in local centres; residential developments near local centres; high design and environmental standards to encourage walking and cycling. NSCA suggests that an important corollary of the need to maintain a range of services and facilities in local centres is the need to consider fully the impact of new out-of-centre retail developments on the diversity of local services.

There is a trade-off between safety and convenience for pedestrians (para 2.16 refers); for example barriers to protect them from vehicles will prevent some crossings. Guidance should start from the premise that urban areas are primarily areas for pedestrians and cyclists, and that vehicles should fit in with whatever the primary users need, rather than the other way around.

We welcome the advice (para 2.21) to protect old public transport routes for possible future re-use. Furthermore, the possibility of extending the use of light rail should be accommodated in structure planning, with possible corridors identified and protected where appropriate.

The draft PPG para 2.22 notes how the demand for travel for different purposes, e.g. travel to and for work, shopping, social and holiday purposes, etc, can be influenced by land use planning policies and suggests various ways of meeting these needs while bearing in mind the need to reduce transport use. NSCA is however disappointed that there is surprisingly little reference to the potential of planning for reducing the environmental impact of freight transport. We recommend that further research is undertaken on this subject. Also enabling children to cycle or walk unaccompanied to school is an important issue both for the health and fitness of children as well as the traffic and air quality consequences of ferrying by adults' cars.

3. Integration and Coordination of Land Use Planning and Transport Procedures

General comment

We welcome the guidance on the role of regional planning guidance and advice that plans should include other transport policies and proposals affecting land use, including transport infrastructure schemes and land use policies for the management of traffic. At such a level it would be appropriate to discuss the application of Environmental Impact Assessment (EIA) techniques to policies and plans as a whole.

Specific comment

The relationship between regional planning guidance and national planning for trunk roads needs to be strengthened (para 3.3). Decisions on the trunk road system are made by the Secretary of State for Transport, albeit in consultation with the Secretary of State for Environment. The programme is updated in issues of White Papers, the last of which was in 1989 (CM693). The planning system should guide this programme; regional planning guidance should be the lead element in the decision making process. Decisions on the principal road network, which are decided in discussions between the DOT and County Engineers/Surveyors on a regional basis, should be tied into the preparation of regional planning guidance, within a broad-based EIA regime.

4. Other Considerations

General comment

The draft includes more detailed advice on transport considerations in development control, such as access, parking, estate roads, development conflicting with transport infrastructure and provision of roadside services. The information set out in the annexes is particularly useful and is welcomed.

Specific comments

Annex A: Measures Complementing Locational Policies in Plans

Planners should be aware of topographical factors which can exacerbate the emission and air quality impacts of pollutants. Emissions of air pollutants from motor vehicles are likely to increase where traffic is climbing a steep gradient, or be concentrated where dispersion is impaired in street canyons. Elevated concentrations of air pollutants can arise from vehicles in semi-enclosed situations such as multistorey carparks, road tunnels, and bus, coach and rail stations with covered access. Planners need to consider the traffic flows, idling times and ventilation rates in these situations and decide if concentrations are likely to be acceptable to the users of these facilities.

Traffic calming measures are likely to increase the number of deceleration and acceleration movements of road traffic in a particular stretch of road. Calming should also mean that traffic travels more slowly and hence at speeds where certain air pollutants per unit travel distance are increased, e.g. carbon monoxide emissions. In some circumstances traffic calming might also increase the amount of time during which vehicles are idling — for instance in places where the road is narrowed to the width of a single vehicle so that cars coming in opposite directions must wait and take turns to pass. Such traffic changes may possibly affect emissions and air quality in areas adjoining the road. A design bulletin on traffic calming which takes account of air quality and noise impacts would thus be welcome.

The guidance generally distinguishes between pedestrians, cyclists and other road users, comprising generally petrol- and diesel-engined vehicles. There is a case for making a further distinction in urban areas between vehicles with improved emission characteristics — for instance electric vehicles, buses with advanced particulate abatement technology, or small cars with very fuel-efficient engines. Mention should be made of the possibility of discriminating in favour of such vehicles by the use of exclusive lanes, dedicated parking or other priority measures. The more efficient use of private transport can also be encouraged by the use of multiple-occupancy lanes, dedicated to vehicles with more than one occupant.

It would be useful to have more information on the air quality benefits of pedestrianisation, particularly fixed site measurement of pollutants before and after pedestrianisation, and personal time-integrated exposure monitoring of pedestrians with portable samplers.

Annex G: Parking Provision and Development Control

Residents-only parking schemes are likely to eliminate or discourage drivers who circulate repeatedly in a particular urban area looking or waiting for parking spaces. This is likely to reduce noise and local air pollution emissions.

It is now common for car-boot sales to be held in urban carparks, for instance at stations on Sundays. These events can produce substantial local congestion with queued traffic and air pollutant emissions from idling vehicles. The congestion and pollution potential of such events need to be carefully considered before they are authorised.

References

1 COM(92) 23 final. European Commission 1992.

2. COM(92) 46 final. European Commission 1992.

3. Quoted in *Digest of Environmental Protection and Water Statistics No. 15* (HMSO 1993).

4. Disturbance Caused by Neighbourhood Noise; Dr. W.A. Utley, NSCA Conference Proceedings (NSCA 1989).

5. Report of the Noise Review Working Party; Department of the Environment (HMSO 1990).

6. Appleyard D. *Livable Street* (University of California Press, Berkeley 1981).

EC DIRECTIVE 92/6: FITMENT OF SPEED LIMITERS TO BUSES, COACHES AND HGVs

Introduction

Under EC Directive 92/6, all new buses and coaches over 10 tonnes maximum gross weight and new goods vehicles over 12 tonnes maximum gross weight must be fitted with speed limiters as from 1 January 1994. The Directive refers to set speeds of 100 km/h (62 mph) for buses and coaches and 86 km/h (53 mph) for HGVs. Existing vehicles first used on or after 1 January 1988 must be fitted with speed limiters by 1 January 1995. A further Directive (92/24) on the technical requirements for speed limiters allows for a performance tolerance of 5 per cent or 5 km/h, whichever is the greater.

The Directive is to be implemented in the UK by amending the *Construction and Use Regulations;* in a consultation paper outlining its proposals, the Department of Transport indicated that it is minded to implement the Directive by stipulating the maximum permissible stabilised speed – i.e. 65 mph for buses and coaches and 56 mph for HGVs.

NSCA Response

NSCA analysis of DOE statistics(1) for the last decade shows that road transport is the only sector where emissions of **all** the major air pollutants are still increasing.

Speed limiters could have an important role to play in the achievement of environmental objectives. The European Commission's Fifth Action Programme for the Environment(2) introduces the concept of sustainable mobility and specifies the promotion of *"changes in driving rules and habits, including speed limits"* as an important element in any strategy to reduce the environmental impact of the transport sector. The EC Green Paper on Transport and the Environment(3) further notes the possibility of using *"technical devices, such as speed limiters, to ensure compliance with imposed speed limits"*.

Emissions of carbon dioxide are related to engine efficiency and are thus increased at both low and high speeds, with an optimum around 50-55 mph(4). The UK is committed to stabilise emissions by 2000, but on current trends emissions in the transport sector will double over the next 30 years. Effective enforcement of the existing national maximum speed limits, or a reduction of the speed limit towards the optimum cruising speed, could secure significant reductions in emissions.

There is also a clear link between road speed and noise. Effective enforcement of lower road speeds could reduce the noise impact of major roads at a time when traffic noise is a growing problem.

The Government has consistently pressed for the tightest achievable emission standards for HGVs(5), whilst fitting of speed limiters to certain classes of HGV is presented as an example of Government action to reduce emissions of carbon dioxide(6). The Government also advises that environmental effects should be taken into account in policy appraisal(7).

In view of the above, it is disappointing to find the current proposals presented without any analysis of the potential environmental costs and benefits of the options. In particular there appears to be an unquestioning assumption that the flexibility offered by Directive 92/6 should be exploited to allow the maximum permissible set speed (65 mph for buses and coaches, 56 mph for HGVs). The Directive could equally be interpreted to allow a set speed of 57 mph (or more simply 60 mph) for buses and coaches and 48 mph (or more simply 50 mph) for HGVs. The proposals thus enforce set speeds for both classes which are 8 mph higher than a more conservative interpretation of the Directive would allow. Nowhere is this justified.

We urge that the Department should analyse the likely impact on emissions of carbon dioxide, noise and other pollutants to be expected from set speeds at the upper and lower limits of interpretation. Only then can an informed judgement be made on competing environmental and economic factors. Doubtless the Department will receive considerable information about the likely economic impact of its proposals. Unless data becomes available on environmental impacts, the Society must make a presumption in favour of restraint and would thus argue:

- Speed limiter settings should be extended to cover **all** those vehicles covered by national regulations, but not EC regulations. This includes both buses over 7.5 tonnes **and** HGVs over 7.5 tonnes.
- Speed limits for all HGVs and coaches should be lowered to bring them in line with vehicles which have limiters fitted. This brings into question the sense of setting a 55 (or 56) mph motorway speed limit for HGVs. 50 mph, and 60 mph for buses and coaches, would be much simpler to enforce.
- We would oppose any relaxation of speed limits on dual carriageways, unless it can be shown that the impact on emissions would be negligible. Safety considerations may provide further arguments against such relaxation.

References

(1) Digest of Environmental Protection & Water Statistics HMSO, 1992.
(2) Towards Sustainability, COM(92) 23, Commission of the European Communities, 1992.
(3) Green Paper on the Impact of Transport on the Environment, COM(92) 46, Commission of the European Communities, 1992.
(4) Vehicle Emission Control, J.M. Dunne, Investigation of Air Pollution Standing Conference, 1991.
(5) This Common Inheritance: the First Year Report, HMSO, 1991.
(6) This Common Inheritance: the Second Year Report, HMSO, 1992.
(7) Policy Appraisal and the Environment, DOE, HMSO, 1991.

ENVIRONMENTAL PROTECTION ACT

Review of the Prescribed Processes and Substances Regulations

The Department of the Environment, Welsh and Scottish Offices published in March proposals for amending the above regulations (SI472). No proposals were made for extending the lists of prescribed substances. Amendments proposed for the schedule of prescribed processes related both to definitions — or scope — of processes and whether they should be prescribed for integrated pollution conrol by HMIP/HMIPI or local authority air pollution control. Comments were invited on proposed amendments emanating from the DOE, and on a second list emanating from a number of sources.

NSCA welcomed the opportunity to comment on the proposed revisions to SI 472, which has provided the backbone of enforcement for Part I of the *Environmental Protection Act;* and it looks forward to effective refinement of the Regulations on the basis of practical experience and new knowledge. NSCA would caution against any suggestions that this review be taken as a signal to reduce the overall regulatory burden on industry. The full and fair application of optimal environmental regulation is a key factor in providing consistency of enforcement within and between competing industries, and is a positive incentive to improve economic as well as environmental performance. The need is to secure an appropriate balance between regulation, financial instruments and exhortation which achieves agreed objectives in environmental protection and economic development.

The main aim of the review, NSCA suggested, should be to improve the regulatory 'fit' and iron out inconsistencies. If implemented, many of the proposed changes to process definitions will lead to changes in implementation times, particularly where processes are moved from HMIP to local authority air pollution control (LAAPC). It would be unfortunate if, due to transfer to LAAPC, the implementation dates for any particular processes are allowed to slip from the dates that they would have come under HMIP control.

We regret that the opportunity has not been taken to enlarge Schedule 5 (substances prescribed for discharge to water). The true spirit of integrated pollution control dictates that a much wider range of pollutants should be made liable to the BATNEEC requirement to prevent or minimise — rather than simply to render harmless — discharges to water.

Clarification is required on the policy for apportioning processes between Parts A and B. In the past the reason for scheduling a process for air pollution control was that discharges to air needed supervision because of health or environmental effects (actual or potential) by an expert inspectorate and on a national scale. The yardstick applied in a number of examples in the consultation paper seemed purely to be on the distinction between the potential for multi-media or single media (air) emissions.

NSCA made a number of detailed comments, which included the following:

(a) **Incineration (Section 5.1 Part B):** The incineration of animal remains is normally exempt from LAAPC where incineration capacity is less than 50 kg/hour. Representations made to the DOE suggested that this discriminates against pet crematoria above 50 kg/hour which, unlike smaller ones, would be required to comply with BATNEEC. Pet crematoria below 50 kg/hour are subject to the *Clean Air Acts* and the statutory nuisance provisions of Part III of the *Environmental Protection Act* (or the *Public Health (Scotland) Act 1897).*

NSCA is of the opinion that thresholds give rise to some problems in the enforcement of the EPA, and pet crematoria are a case in point. There is no environmental case for making a distinction between pet crematoria and other animal carcass incinerators. We recommend the total removal of the 50 kg threshold; this would prevent such 'threshold effects' and tend to favour fewer, larger, units over time. Very small pet incinerators would be excluded through triviality, but the potentially polluting mobile animal carcass incinerators would require authorisation.

(b) **Coating Processes and Printing (Section 6.5, Part B):** Under the Regulations only a very few coating and printing processes which are likely to produce 1,000 tonnes of special waste are controlled by HMIP/HMIPI; most — except vehicle respraying — are controlled by local authorities where the process "may result in the release into the air of particulate matter or any volatile organic compound" with various thresholds applying to use over a 12 month period:

- 20 tonnes or more of any printing ink, paint or other coating material which is applied in solid form; or
- 20 tonnes or more of any metal coatings which are sprayed on in molten form; or
- 5 tonnes or more of organic solvents.

The criteria for road vehicle respraying are similar in that there must be a potential for particulate matter or VOC emissions, but the organic solvent usage threshold is only two tonnes.

So far as NSCA is concerned, the threshold for road vehicle spraying is one of the main issues in the consultation document. The original two tonne authorisation threshold has in effect been raised — perhaps doubled — by the exclusion of recycled solvent. The Society would not wish to discourage the reuse or recycling of solvents, but this does make enforcement more difficult in a trade which is not known for 'best practice' book keeping.

There is thus a good case for lowering the threshold limit in order to return effectively to the status quo. NSCA has already made plain its wish to see the limit reduced to 0.5 tonnes; significant medium sized operators would then come within EPA authorisation, assuming that the current definition of "use" remains in force. If, as has been suggested, the limit were further lowered to 0.25 tonnes, the majority of small backstreet garages would come within the threshold, placing an undue burden on small businesses and local authority resources, for a disproportionately small environmental gain. The threshold could be reviewed in future years, in the light of the developing UK VOC reduction strategy.

The principle of adjusting the solvent threshold to reflect the position before the

> ruling on "use" suggests that the five tonne threshold for other solvent users should be reduced to two tonnes.
>
> We also consider that the 20 tonne threshold for thermally sprayed coatings is too high, if such processes are thought worthy of EPA Part I control. There are very few thermal sprayers large enough to require authorisation based on a 20 tonne limit, and many under the limit spray toxic metals such as copper, nickel and lead. To catch such processes, we recommend that the threshold be reduced to one tonne per annum. Various ceramics and oxides are also thermally sprayed; these are not caught by the current definition which specifically refers to "metal coatings", and thus it is suggested that the definition be changed to "coatings".

Copies of NSCA's full comments to the DOE are available from NSCA at 136 North Street, Brighton, Sussex BN1 1RG.

SMOKE CONTROL PROGRAMMES 1992/93

Clean Air Grants for Smoke Control Areas

The Government has announced that grants to local authorities in England and Wales towards the costs of implementing smoke control orders will no longer be available from 1995. In Scotland grants were discontinued from April of this year.

NSCA wrote to the Environment Minister expressing concern and urging that the issue be reconsidered. The Society's annual surveys on the extent of smoke control reveal that many local authorities have yet to complete their smoke control programme, either suspending progress or allowing timetables to slip. This means that in some areas parts of towns are able to burn polluting unauthorised fuel whilst other parts are "smokeless". This leads to local inconsistency of enforcement, and will make the promised ban on sales of unauthorised fuel in smoke control areas more difficult to implement.

The current negotiations on the EC draft air quality framework Directive suggest that air quality standards will be tightened considerably in the near future. Some current WHO guideline values may in effect become limit values. Monitoring co-ordinated by Warren Spring Laboratory on behalf of the DOE indicates that many parts of the UK currently exceed the guide values for smoke and sulphur dixoide, even though limit values are now rarely exceeded.

During 1992/93 grants totalling £3,040,799 were awarded to 35 local authorities, and a total of £1,329,724 has been approved for 21 authorities in 1993/94. There are currently over 40 local authorities completing programmes, and a large number who have either suspended programmes or delayed setting a target. This implies that there is still a great deal of work to be done, but without Government aid there is little chance of completion.

Thus NSCA believes the Clean Air Grant should remain available to local authorities as an important policy option for improving local air quality. The creation of smoke control areas still has potential for improving air quality to meet agreed guidelines, but requires resources to assist citizens — particularly those on low incomes — in making the change to cleaner combustion.

Smoke Control Areas

The following table lists the local authorities in the United Kingdom who currently enforce smoke control. The information has been compiled directly from returns from local authorities. It can be assumed that any authority not listed does not have a smoke control programme.

The table shows the target date for completion of the smoke control programme; the area of the authority currently covered by smoke control and the number of premises currently covered by smoke control orders. The figures are for the position on 31 March 1993.

British Isles divisions, issued by the Department of the Ennvironment are listed below:

East Anglia	Norfolk, Suffolk
East Midlands	Derbyshire, Leicestershire, Lincolnshire
Greater London	
North West	Cheshire, Greater Manchester, Lancashire, Merseyside.
Northern	Cleveland, Cumbria, Durham, Northumberland, Tyne and Wear.
Northern Ireland	
Scotland	
South East	Bedfordshire, Berkshire, Buckinghamshire, East Sussex, Essex, Hampshire, Hertfordshire, Kent, Oxfordshire, Surrey, West Sussex.
South East	Avon, Cornwall, Devon, Dorset, Gloucestershire, Somerset, Wiltshire.
Wales	Clwyd, Dyfed, Gwent, Gwynedd, Mid Glamorgan.
West Midlands	Hereford and Worcestor, Salop, Staffordshire, Warwickshire, West Midlands.
Yorkshire and Humberside	Humberside, North Yorkshire, South Yorkshire, West Yorkshire.

Key
Comp — completed
n/k — not known
susp — suspended
clld — programme cancelled
x — no return received this year, previously returned figures used.

Authority	**Target Date**		**% of LA Covered**	**Premises**
EAST ANGLIA				
Cambridge CC	Susp		14	n/k
Kings Lynn & W N BC	n/k		0.2	4474
Norwich CC	Susp		16	3575
Peterborough CC	n/k	x	8.3	34126

Authority	Target Date		% of LA Covered	Premises
EAST MIDLANDS				
Amber Valley BC	n/k		6	8519
Ashfield DC	Comp	1992	100	47790
Bassetlaw DC	1993	x	9.7	33719
Blaby DC	Comp		29	20244
Bolsover DC	1993		100	32501
Broxtowe BC	Comp		75	36000
Chesterfield BC	Comp	1991	100	39600
Corby DC	Comp		13	11860
Derby CC	Comp	1986	100	90233
Erewash BC	1992		18.33	21462
Gedling BC	1994		33	39652
High Peak BC	Comp	1986	3	14148
Leicester CC	n/k		99	103100
Lincoln CC	Comp	1989	100	39539
Mansfield DC	1993		98.5	44274
N E Derbyshire DC	n/k		30	30266
Newark & Sherwood DC	Comp	1991	4	30266
North Kesteven DC	n/k		0.13	983
Northampton BC	1993	x	40	22800
Nottingham CC	Comp	1991	100	134085
Oadby & Wigston BC	n/k		6	903
Rushcliffe BC	Comp	1983	3.1	11569
South Kesteven DC	Comp		n/k	850
West Lindsey DC	Comp	1990	0.02	1
GREATER LONDON				
Barking & Dagenham LB	Comp	1985	100	70118
Barnet LB	Comp		100	134329
Bexley LB	Comp		100	89886
Brent LB	Comp	1984	100	109245
Bromley LB	Comp	1979	79	137000
Camden LB	Comp	1968	100	88214
Corp. of London	N/A		100	12241
Croydon LB	Susp		62	106000
Ealing LB	Comp		100	112635
Enfield LB	Comp	1973	100	110000
Greenwich LB	Comp	1972	100	94705
Hackney LB	Comp	x	100	n/k
Hammersmith LB	Comp	1967	100	73000
Haringey LB	Comp		100	93000
Harrow LB	Comp	1975	100	78089
Havering LB	Comp	1979	100	ALL
Hillingdon LB	Comp	1980	100	96000
Hounslow LB	Comp	1972	100	94967
Islington LB	Comp	1969	100	65000
Kensington & Chelsea RB	Comp	x	100	25288
Kingston U Thames LB	Comp	1980	100	55738
Lambeth LB	Comp	1978	100	116000
Merton LB	Comp	1977	100	65800
Newham LB	Comp		100	95000
Redbridge LB	Comp	1974	100	78000
Richmond LB	Comp		100	88914
Southwark LB	Comp	1987	100	116.334

Authority	Target Date		% of LA Covered	Premises
Sutton	Comp		100	67730
Tower Hamlets LB	Comp		100	n/k
Waltham Forest LB	Comp	1985	100	90000
Wandsworth LB	Comp	1980	100	121000
Westminster LB	Comp	1970	100	116300
NORTH WEST				
Blackburn BC	Comp	1986	38.4	48271
Bolton MBC	1993		96.8	103445
Burnley BC	Comp	1980	82	42050
Bury MBC	n/k		n/k	55877
Chorley BC	n/k		2.2	3186
Crewe & Nantwich BC	Comp	1993	2.3	12214
Ellesmere Port BC	Comp	1982	21	23114
Halton BC	Susp	x	90	39933
Hyndburn BC	Comp	1980	92	37976
Knowsley MBC	Susp		23	20837
Lancaster CC	n/k	x	5.67	9478
Macclesfield BC	Comp		n/k	2635
Manchester CC	Comp	1985	100	214000
Oldham MBC	1993		60.7	102788
Pendle BC	Comp		36	29500
Preston BC	Comp	1985	26	48675
Ribble Valley BC	Comp		1.49	890
Rochdale MBC	Comp	1989	70	78222
Rossendale BC	1991		91.9	26816
Salford CC	Comp	1978	100	90279
Sefton MBC	n/k		5.7	2587
South Ribble BC	1994		64	37485
St Helens MBC	1993		94.61	69527
Stockport MBC	n/k		79	104027
Tameside MBC	Comp	1980	100	100711
Trafford MBC	Comp	1982	100	97282
Vale Royal BC	n/k		7.2	11236
Warrington BC	Comp	1979	95	73400
West Lancashire DC	Susp		20	14236
Wigan MBC	n/k		56	73255
Wirral MBC	n/k		67	103187
NORTHERN				
Allerdale DC	1993	x	0.4	4348
Alnwick DC	n/k		0.004	76
Blyth Valley BC	1992		100	35000
Carlisle CC	Susp		0.3	4500
Castle Morpeth BC	1997		1.65	6155
Copeland BC	n/k		0.2	1671
Darlington BC	Comp	1987	13.1	39989
Derwentside DC	n/k		n/k	4109
Easington DC	1993		25	30678
Gateshead MBC	1992		100	99000
Hartlepool BC	Comp	1982	39	34416
Langbaugh BC	1996		22.5	49433
Middlesbrough BC	Comp	1979	91	56100
Newcastle-u-Tyne MBC	Comp	1978	100	135000
North Tyneside MBC	n/k		100	72000

Authority	Target Date		% of LA Covered	Premises
Sedgefield DC	None		8.6	6000
South Derbyshire DC	n/k	x	2	4812
South Tyneside MBC	1990	x	90	68002
Stockton-on-Tees BC	Comp	x	34	60000
Sunderland CC	1998		43.7	60139
Wansbeck DC	1993		100	28606
NORTHERN IRELAND				
Antrim BC	Comp	1976	100	7192
Ards BC	None		0.05	823
Armagh DC	n/k	x	5	96
Ballymena BC	Susp		0.9	890
Belfast CC	1996		79.65	93394
Castlereagh BC	n/k		32.5	19719
Down DC	n/k		0.003	n/k
Larne BC	1998		0.46	290
Newry & Mourne DC	1997		0.1	182
Newtonabbey DC	n/k	x	5	7084
North Down DC	n/k		5	1090
SCOTLAND				
Bearsden & Milngavie DC	n/k	x	98	15550
Clackmannan DC	n/k		n/k	3900
Clydebank DC	Comp	1980	100	19967
Cumbernauld & Kilsyth	n/k		1.14	2080
Cunninghame DC	1995		1	6468
Dumbarton DC	2005		6	16957
Dundee CC	n/k		40	69778
Dunfermline DC	1995		1.2	5476
East Kilbride DC	n/k		15	26790
Edinburgh DC	1995	x	52	105000
Ettrick & Lauderdale	n/k		0.07	6993
Falkirk DC	1995		23	41455
Glasgow CC	Comp	1992	100	329497
Hamilton DC	n/k		12.8	16844
Inverclyde DC	n/k		23	9290
Kilmarnock & Loudoun	n/k		<1	577
Kirkcaldy DC	1996		9.5	15236
Kyle & Carrick DC	n/k	x	0.04	156
Monklands DC	1995		80	25612
Motherwell DC	n/k		2	6518
Nithsdale DC	None		<1	7865
Perth & Kinross DC	n/k	x	0	40500
Renfrew DC	Clld		29	71500
Roxburgh DC	n/k	x	0.1	1900
Stirling DC	n/k		<1	2050
Strathkelvin DC	n/k		9	5500
West Lothian DC	n/k		6	16000
SOUTH EAST				
Aylesbury Vale DC	Susp		<1	5300
Basildon DC	n/k		16.5	21682
Bedford BC	Comp	1987	4	36150
Bracknell Forest BC	Comp		14	35000
Brentwood DC	n/k	x	40	2856

Authority	Target Date		% of LA Covered	Premises
Brighton BC	Susp		10	24392
Broxbourne BC	Comp	1988	100	25637
Canterbury CC	n/k		0.34	2865
Crawley BC	n/k	x	37.9	38243
Dacorum BC	Comp		7	15000
Dartford BC	Comp		n/k	31035
Elmbridge BC	Comp		n/k	50
Epping Forest DC	None		1.7	2463
Fareham BC	2000		n/k	n/k
Gillingham BC	Comp		100	37183
Gravesham BC	Comp	1985	18	25278
Guildford BC	Susp	x	4	10517
Harlow DC	1994		80	30000
Hertsmere DC	n/k		10	7913
Luton BC	Comp	1979	100	85000
Milton Keynes BC	Susp		10.25	33300
North Herts DC	Comp		1.4	5000
Oxford CC	Susp		61	35000
Portsmouth CC	Susp		16.8	19039
Reading BC	Susp		62	45000
Rochester U Medway CC	n/k		16	19974
Sevenoaks DC	Comp	1969	1.49	7344
Slough BC	Comp	1988	100	39796
South Buckingham DC	None		<1	109
South Oxfordshire DC	n/k		0.3	400
Southampton CC	Comp	1981	32.6	27551
Spelthorne BC	None		85	31852
Stevenage BC	Comp	1982	98	n/k
Thurrock BC	None		22.23	22761
Watford BC	Comp	1979	100	29016
Windsor & Maidenhead RB	Susp		6	2655
Wycombe DC	Comp		5	21500
SOUTH WEST				
Bath CC	1994		88	34180
Bristol CC	Comp	1988	100	155340
Cheltenham BC	Susp		35.15	16235
Exeter CC	n/k		60	19000
Kingswood BC	n/k		0.1	130
Northavon DC	Comp	1990	5.32	12885
WALES				
Alyn & Deeside DC	n/k		0.1	780
Delyn BC	n/k		1.7	820
Newport BC	n/k	x	0.14	1178
Swansea CC	Comp		<1	2710
Wrexham Maelor BC	Susp		2.4	10390
WEST MIDLANDS				
Birmingham CC	Comp	1986	100	459104
Cannock Chase DC	1998		6.65	8540
Coventry MBC	Comp		100	76659
Dudley MBC	Comp	1989	100	132500
East Staffordshire DC	1994		5	18000
Lichfield DC	1993		10	21205

Authority	Target Date		% of LA Covered	Premises
Newcastle U Lyme BC	1995		14.1	31700
North Shropshire DC	Susp		0.3	1900
North Warwickshire BC	1992		16	16764
Nuneaton & Bedworth BC	1994		61	31729
Rugby BC	Comp	1979	9	23202
Sandwell MBC	Susp		31	34446
Shrewsbury & Atcham BC	n/k		0.7	3350
Solihull MBC	1993		28.5	57618
South Staffs DC	n/k		5.1	3066
Staffs Moorlands DC	1996		3.42	16729
Stoke-on-Trent CC	1992		100	104151
Tamworth BC	Susp		63	22368
Walsall MBC	n/k		81.4	91000
Warwick DC	Comp		10	36003
Wolverhampton MBC	None		76.95	67775
Worcester CC	1992		100	32904
Wrekin DC	Susp		13	19966
Wyre Forest DC	n/k		1.32	6867
YORKSHIRE & HUMBERSIDE				
Barnsley MBC	1992		45	78158
Bradford MBC	n/k		56	180106
Calderdale MBC	n/k		45.2	83000
Chester Le Street DC	ongoing	x	13	2497
Craven DC	Comp	x	29	8207
Doncaster MBC	1993		78	102.414
Glanford BC	n/k		1.2	4615
Harrogate BC	Susp		1.1	21.143
Hull CC	Comp	1992	100	110781
Kirklees MBC	1993		100	153821
Leeds CC	Susp		54.61	223463
Rotherham MBC	1993		99	111970
Ryedale DC	1995		0.48	11244
Scunthorpe BC	Comp	1981	100	27200
Selby DC	Comp	1990	4.3	11285
Sheffield CC	Comp	1978	64	222338
Wakefield MBC	1993		100	154313
York CC	Comp	1990	100	39983

APOLOGY

The Changing Face of Glasgow's Air Quality
by Calum MacDonald, Eric Hampton and Owen Harrop

The above article which appeared in Volume 22 No. 4 of *Clean Air* included a figure showing nitrogen dioxide levels in Glasgow City (page 236). The authors of the article wish to make it clear that the source of this figure was the UKAEA Report, AERE-R-12447, August 1990 entitled *The Glasgow Nitrogen Dioxide Survey* by D.H.F. Atkins, D.V. Law, M. Neate and S.L. Bennett.

The authors offer their apologies to UKAEA for failing to acknowledge the source of the figure in their article.

NSCA NEWS

WASTE MANAGEMENT

New Approaches, New Priorities

NSCA SPRING WORKSHOP, OXFORD

23-24 MARCH 1993

NSCA's 1993 Spring Workshop brought together waste managers, regulators and producers to discuss the practical implications of Part II of the *Environmental Protection Act* against the background of the EC Fifth Environmental Action Programme and Directives on hazardous and municipal wastes.

After examining policy influences and life cycle analysis as a foundation for rational waste management, the Workshop addressed practical issues raised by the new legislation. Case studies examined good practice in contrasting areas and industries and technologies offering the potential for waste minimisation were considered. Throughout the emphasis was on human factors, including training and the challenge posed by the public acceptability of waste management practices and facilities.

The following is a summary of the conclusions of the Workshop. A Workshop resource pack, including available papers and full conclusions is available from NSCA, price £10.

Objectives and Approach

Waste management has two broad objectives:

- Resource conservation by way of better use of materials, energy and land including recycling, where this brings a net benefit over the entire life cycle of a product or service.
- Pollution control.

In very general terms, economic instruments can often be the most effective way of securing resource conservation, whereas regulations may be needed to effect pollution control.

THE FRAMEWORK FOR WASTE MANAGEMENT

Regulatory factors

The EC 5th Community Action Programme for Environment *Towards Sustainability* provides a sound strategy for waste management in an increasingly sustainable economy. UK legislation including Part II of the *Environmental Protection Act 1990* should provide a comprehensive basis for improving waste management. However the new legislation involves major changes, and there will be a need for prompt and perceptive evaluation of the effects of the new package to make sure that it is delivering the desired effects cost-effectively.

Incentives

Economic instruments/market mechanisms are potentially important, especially in relation to resource conservation methods, since they provide a way of 'internalising' all costs of waste management. It will be a major challenge to devise measures which:

- Are effective in securing optimum levels of waste avoidance and recycling.
- Reflect external costs accurately.
- Are adminstratively feasible.
- Impinge fairly on all sectors of the economy and the community.

Scientific Factors

Rational waste management practices should rest on sound scientific foundations in analysis and development. IPC, BATNEEC, BPEO and life cycle analysis (LCA) are valuable concepts, but careful interpretation is needed if the true resource cost of waste management options is to be revealed.

The Human Component

a. Efficiency, effectiveness and confidence in the vast range of operations involved in waste management depends on the competence, motivation and integrity of the people responsible for them. It will be important to evaluate the results of measures designed to improve human performance in order to ensure that they are producing the desired effects in all those involved in both operation and regulatory aspects of waste management.

b. Public confidence in and acceptance of controversial waste management facilities such as incinerators, anaerobic digesters, and waste transfer stations, are important aspects of the development of rational waste management systems. Developers need to understand public concerns from the outset and address these in terms with which their potential neighbours can identify. Transparency and real, rather than token, involvement in community groups are desirable, and may be essential if public confidence in regulators is low. Thorough review and adjustment will be needed to ensure the optimal balance between external and self-regulation and audit.

Institutional Factors

Concentration of regulatory interests responsible for waste management and associated environmental protection measures in the Environment Agency should facilitate the integration of waste management. Specific measures will be needed, however, to ensure that waste management plans remain sensitive to local conditions and that there is local accountability. Given such measures, it should be possible to reap the best of both worlds by exercising local choice in the light of national guidance.

DIRECTIONS IN WASTE MANAGEMENT

Waste Minimisation

In addition to financial incentives, Part I of the *Environmental Protection Act 1990,* the *Eco Management and Audit Scheme Regulation* and BS7750 provide formal mechanisms for promoting waste minimisation. Guidance on these mechanisms should emphasise the importance of waste minimisation as opposed to end-of-pipe techniques wherever possible.

Recycling

Recovery of materials and energy will play an important part in waste management to the extent that the nature of measures within local plans will need to be carefully matched to local circumstances if they are to represent minimum resource usage. The realism of national targets and the scale of economic incentives needed to secure them should be evaluated in the light of relevant trials, such as those in Leeds and Aberconwy which were considered at the Workshop, and in the light of changing markets for recycled materials.

TECHNIQUES OF WASTE TREATMENT AND DISPOSAL

Incineration

Moving-grate mass-burn incineration techniques can provide reliability and consistency, coupled with high levels of emission control. Incineration is an efficient method for recycling energy and greatly reduces the pressure on landfill, and is therefore likely to be an increasingly important component of waste management strategies as landfill costs increase. The challenge is to gain public acceptance of proposed developments and of the associated regulatory regimes. To this end community involvement in project development and control will frequently be desirable. It will also be important to achieve an allocation of risk which will secure project finance. In this connection, there should be flexibility to vary the heat, electricity and material outputs over the life of the plant so that operators can respond to unexpected changes in circumstances. As a first step, the scope of the Non Fossil Fuel Obligation should be widened to place an economic value on the heat as well as the electricity output from incinerators.

Composting and Anaerobic Digestion

Both techniques can be implemented with varying degrees of sophistication. Composting can vary from simple windrows through forced ventilation systems in the open to careful control of the process in enclosed vessels. Anaerobic digesters can deal with a variety of wastes at different moisture contents and different digestion speeds, from high temperature multi-stage processes to accelerated landfill with a cycle time measure in years. In both composting and anaerobic digestion the broad characteristics of the various processes are known, so that there is potential to incorporate them as appropriate into integrated waste management systems. However, recent large-scale operating experience is largely lacking in the UK and consideration should be given to demonstration projects for potentially attractive applications.

Landfill

Landfill will be required for the foreseeable future as the means of final stabilisation and disposal of the residues which will continue to arise inevitably in even the most sophisticated integrated waste management system. There are doubts about the technical feasibility and cost of long-term, reliable containment of leachate to the degree required for protecion of groundwater resources. Accordingly, there is need for clarification of policy so that landfill management practices can be better related to local circumstances and provide a better estimate of the true cost of landfill in a sustainable economy.

CONCLUSION

The Workshop took place at a time of unprecedented change in the way in which we think about and deal with waste. During this period of change, it will be more important than usual to evaluate the effects of change and to respond to the lessons which are learned. Particular attention will have to be paid to public reaction to increased costs.

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REPORT

PRINCIPLES OF ENVIRONMENTAL HAZARD IDENTIFICATION AND RISK ASSESSMENT

Dr. David J. Ball
Environmental Risk Assessment Unit
University of East Anglia

1. Background

In February 1993 the NSCA ran its first Development Workshop. This was entitled 'Local Air Quality Management – the way forward in the UK'. From this emerged a view that regional air quality management could only be fully effected if it were based upon air quality monitoring *coupled with* source inventory surveys.(1) There was also a need for air quality dispersion modelling to provide the crucial link between emissions and air quality. The operation of such a system has previously been described for Greater London,(2, 3) arguably one of the more complex pollutant source areas in the UK.

The advantage of the 'monitoring – emission inventory-modelling' approach is clear. It permits a link to be drawn between any projected changes in emission patterns and air quality. It also allows one to assess the cost-effectiveness of emission control measures in terms of their impact upon air quality. Both are essential if this medium is truly to be managed, and resources are to be allocated efficiently.

2. The Total Impact of Risk Reduction Measures

The purpose of NSCA's Training Seminar held in Birmingham on 23 June was to go a step further. Determining the cost-effectiveness of pollutant reduction measures in terms of improvements in air quality is, in many cases, not enough. The point was well made in the prospectus for the Seminar.

> 'Everyone wants to protect the environment but, with limited resources, how can we ensure that our policy priorities really reflect the severity of the many threats to human health and the wider environment?'

This is an important question. It has been said, for example, that during the first 20 years of the US Environmental Protection Agency it chose, or was forced, to work on problems which the public (or interest groups) deemed important, and not those which necessarily posed the greatest risk to public health. In other words, congressional action had driven the EPA to impose regulations that required US society to spend tens of billions of dollars on problems which in some cases posed a relatively small human health or ecological hazard but were high on the social or political agenda.(4)

This has led to pressures in the USA to consider more explicitly the cost/benefit/effectiveness of proposed environmental risk reduction measures. Further evidence of these kinds of thoughts can be found in the US Occupational Safety and Hygiene Association's (OSHA) consideration of the use of 'risk-risk' analysis in its formulation of regulations on air contaminants. The risk-risk theory contends that costly health and safety regulations designed to protect, in that case, the safety of workers and consumers could actually be detrimental(5). The theory suggests that additional costs would result in lower worker wages, more unemployment and higher consumer prices, which would serve to reduce worker and consumer health.

Not everyone accepts this theory and it can, for example, be argued that regulatory demands on one sector of industry will generate business for another. Nonetheless, examples have already surfaced in the UK which cannot be readily dismissed. We have seen, in the last year alone, debates over the wisdom of stringent new standards for tap water quality,(6) over hugely expensive safety measures in the London Underground in the wake of the King's Cross disaster,(7) and over some alleged safety measures for children's playgrounds.(8) There would appear to be a growing feeling that over-investment in safety may suffer the same symptoms as under-investment. This leads directly to the issue of the optimum level of safety, and how this might be identified. This is where the techinque of risk assessment provides a potentially useful tool.

3. Risk Analysis and Risk Management — Some Definitions

Risk has been defined in a number of ways. In today's context it is most appropriate to talk in terms of environmental risk to health, which will be taken here to mean the probability of an adverse effect on human health resulting from exposure to a particular environmental agent or combination of agents.(9) This could be expressed as the average annual risk per individual, or the average number of individuals affected annually in a given population etc.

The importance of a given risk depends on the severity as well as the frequency of the effect in question. Determinants of severity include such factors as the extent to which the effect is or is not reversible, progressive, painful, lethal, etc, and clearly encompass psycho social, aesthetic, ethical and economic considerations as well as health impacts per se.

Apart from objective measures of frequency and severity, other qualitative characteristics, such as those listed in Figure 1, can be important in determining how risks are perceived.

The assessment of an environmental risk to human health involves a series of steps, beginning with identification of the causative agent or exposure situation and concluding in an evaluation of the number of persons whom it may ultimately affect and the severity of the impacts. The first step in the process (Figure 2) is generally taken to be *hazard identification.* This consists of identifying potentially harmful agents to which persons may be exposed, irrespective of the level of their exposure. Hazardous agents may be identified by a variety of techniques ranging from laboratory experiments on animals or bacteria to epidemiological or clinical studies.

In the second step, the *dose-response* or *dose-effect* relationship for the agent in question is sought. However, since ambient exposure levels are usually much lower than levels at which toxic effects have been observed, extrapolation from the effects at high dose levels is necessary to arrive at the appropriate risk estimate.

It should be noted that both of these steps present difficulties. Too few data are available on chemical toxicity to adequately assess the bulk of chemicals in commercial production, and dose-response relationships for humans frequently rely upon extrapolations from high to low dose, and from animals to humans. Neither is without uncertainty.

The third step is *exposure assessment.* Despite its importance this has often been neglected. To date human exposure has frequently been approximated by air quality data from fixed monitoring sites. This can lead to considerable errors as is discussed below in Section 7.

The fourth step is sometimes known as *risk characterisation.* In this, the above information is combined to give an estimate of the number of persons expected to be affected and the types and severities of the effects.

These steps fit essentially into the first two stages of the risk management process as illustrated by Figure 3. Additional important considerations come in the risk evaluation stage, including political, social and economic factors. Nor does Figure 3 identify the important and pervasive role of risk communication which should permeate the entire process.

4. Knowledge Needed for Risk Decisions

It is fairly common to hear calls for action to reduce pollutant emissions which have been based on little more than a few spot measurements which exceed someone's specified environmental criterion. The WHO has, for example, promulgated many guidelines for drinking-water quality and ambient air quality which have been misused in this way.(10) A careful reading of the WHO manual reveals that the air quality guidelines are not intended to be regarded as standards, and that the guidelines should be interpreted in the context of prevailing exposure levels and environmental, social, economic and cultural circumstances. Thus, the guidelines are intended to provide guidance in making risk management decisions. Indeed, for non-threshold pollutants including most carcinogens, WHO provides risk estimates only (e.g. for benzene in the air no 'safe' level can be specified, and a lifetime risk factor of leukaemia of 4×10^{-6} is given for continuous exposure to $1 \mu g/m^3$).

It is quite clear, therefore, that a great deal of additional knowledge is required for risk decisions beyond that of purely *technical* risk assessment in the overall risk management process. Typical questions, grouped under four headings are listed below:(11)

Information about the Nature of Risks and Benefits

- What are the hazards of concern as a consequence of a pollutant or an activity? What environments, species, or individuals might be harmed? Are the consequences serious or irreversible? What are the benefits of the activity and to whom do they accrue?

- What is the probable exposure of target organisms or ecosystems?
- What is the probability of each type of harm?
- What is the distribution of exposure?
- Are there sensitive groups?
- What are the qualities of the hazard? Can those exposed reduce or eliminate their exposure?
- What is the total population risk based on all the above?

Information on Alternatives

- What options are available to control the hazard? Some might be aimed at reducing emissions, others at reducing exposure, and others at mitigating consequences.
- What risks do alternative actions impose, and are there any other benefits?
- How effective is each alternative?
- What is the cost of each alternative?

Uncertainties in Knowledge about Risks and Benefits

- How reliable and complete are the risk/benefit data?
- What assumptions were made?
- How sensitive are the estimates to the assumptions?
- How sensitive is the decision to changes in the estimates?

Information on Management

- Who is responsible for the decision?
- What issues are of legal significance?
- What constrains the decision?
- What resources are available for implementing the decision?

5. Risk Management Practices in Britain

Whichever sector of British society one is concerned with, it is seldom the case that risks are required to be eliminated. It is recognised that, for society to function, a certain level of risk has to be tolerated, and risks are generally only required to be reduced so far as is practicable or reasonably practicable.

The principle is best expressed in the *Health and Safety at Work Act 1974.* In this context, risks to life associated with an activity are first assessed against three criteria (Figure 4): whether a risk is so great or the outcome so unacceptable that it must be refused altogether; whether the risk is so small (de minimis level) that no further precaution is necessary; and if the risk falls in the intermediate zone, that it has been reduced to the lowest level practicable, or, in other words, in accordance with the ALARP (As Low As Reasonably Practicable) philosophy.

Two important principles are implied by ALARP. One is that there is an implicit acceptance of residual risk in all our activities. Zero risk is rarely attainable, or is only attainable at disproportionate opportunity cost, and is seldom a feasible or worthwhile goal. A 'broadly acceptable' risk criteria of 10^{-6} per annum of mortality has been proposed by the Health and Safety Executive.(12) A similar value has been arrived at by a Royal Society study group led by Sir Frederick Warner,(13) though suggesting that the level below which further control might be considered unjustified could be as low as 10^{-7} per annum in some cases.

The second important principle is that of setting a balance between the benefits of safety and the costs of achieving it. In general, risk reduction costs money and the optimum level of safety is achieved when the risks have been reduced to the point where the cost of any extra reduction just equals its benefits. This kind of approach is in fact quite widely applied, and can be found in the context of, for example, highway safety decision making, radiological protection, and off-shore safety.

6. Risk Management and the Environment

The desirability of equating marginal costs and benefits rather than insisting on the lowest risk that is technically achievable has also been recognised in the environmental field.

In principle, there are several ways by which environmental problems may be mitigated. These are:

- Technology-based standards.
- Ambient-based standards.
- Benefit-based standards.

Technology-based standards specify a discharge limitation based on the availability and affordability of technology. Ambient-based standards specify a safe or clean environment based on protection of human health and welfare, without consideration of cost or technological feasibility. Between these two extremes, benefits-based standards focus on the trade-off between the risks to society from pollution and the costs society must pay to reduce pollution.(14)

Historically a technological approach to emission reduction has been used in the UK to deal with air pollution, unlike the approach to water pollution which has been more concerned with water quality.

Reed and Giltrow(15) have pointed out that, in attempting to determine if a reasonable balance has been struck between the cost of pollution control and the ensuing benefits, difficulties exist in both the identification of the true costs of control and the value of the benefits to health and the environment. Nonetheless, the aim has been, in the absence of a more systematic approach based on quantitative risk assessment, to develop pragmatic approaches with essentially the same goals, as far as possible, to ensure that costs incurred should be commensurate with the benefits arising. Thus, the notion of practicability in the traditional BPM (Best Practicable Means) approach includes considerations of a technical and financial nature. However, it is likely that this is more from the point of view of cost-effectiveness rather than cost-benefit.

BATNEEC (Best Available Techniques Not Entailing Excessive Cost) also presumes that the best available techniques will be used, where 'best' is taken to mean most effective in preventing, minimising or rendering harmless polluting emissions. It is, however, similarly qualified by economic considerations, where the costs of applying best available techniques would be excessive in relation to the nature of the industry and the evnironmental protection to be achieved.(16) In other words, the NEEC portion of BATNEEC means that the presumption in favour of BAT can be modified by two sorts of economic cost considerations; whether the costs of applying BAT would be excessive in relation to the environmental protection achieved; and where the costs of BAT would be excessive in relation to the nature of the industry.

There is difficulty in applying such a philosophy consistently. Sometimes what is referred to is a financial cost to the polluter (pollution abatement costs), and at other times the wider economic and social costs of pollution are included.

7. Some Problems of Technical Risk Assessment

In Section 3 of this paper it was pointed out that the goal of applying risk management principles to environmental issues was faced with a number of difficulties. Lack of toxicity data and dose-response information were two examples. Nor has the relationship between air quality and health in Britain been fully assessed although the Advisory Group on Medical Aspects of Air Pollution Episodes has begun to produce some useful reviews.(17, 18) Yet another crucial part of the risk equation relates to target *exposure.*

It was noted previously that we tend to rely on fixed ambient monitoring points for assessing population exposure. A recent study of the impacts of vehicle exhaust emissions, on behalf of the Transport Research Laboratory, however, indicated that even for pollutants frequently associated with road vehicles, the largest component of population exposure may actually be attributable to other sources.(19) Confirmation of this is provided by four TEAM (Toxic Exposure Assessment Methodology) studies carried out by the US EPA.(20) These studies were concerned with the measurement of personal exposures to volatile organic compounds (VOCs), carbon monoxide, pesticides and particles.

For VOCs it was discovered that personal exposures exceeded ambient outdoor air concentrations. Median values were typically 2 to 5 times ambient outdoor levels. Personal activities such as smoking, wearing freshly dry-cleaned clothes and using mothballs and deodorants were identified as important sources in some cases for a range of toxic chemicals including benzene, tetrachloroethylene, p-dichlorobenzene, chloroform and trichloroethylene.

In the case of carbon monoxide, important indoor sources were found to be gas cookers and tobacco smoke. Indoor pesticide concentrations were also found to exceed outdoor levels by substantial margins.

A major finding of the TEAM study in relation to airborne particles was that personal exposures in daytime were 50 per cent greater than either indoor or outdoor concentrations. This suggests people are surrounded by a 'personal cloud' of particles as they go through their daily routine.

These findings suggest that we also have a lot to learn about exposure assessment as part of the risk assessment process.

8. Concluding Remarks

In a recent WHO report(21) it is stated that when populations are exposed to air pollutant levels above the WHO air quality guidelines,(10) adverse health effects may occur. However, for many air pollutants it is not possible to assess the health impacts of these exceedances because information on air quality, exposure and dose-response is not yet available in the required form. Nonethelesss, WHO recognises the importance of striving towards this goal in its final recommendation:

> "Comprehensive quantitative risk assessment should be made on the basis of actual human exposures, which are evaluated and compared with exposure-response relationships. Data on both these elements are scarce, and targeted research into these areas should be considerably expanded."

Britain, like America, has been subject to the same environmental shock waves which began with the publication of Rachel Carson's *Silent Spring.* The subsequent rise of well organised interest groups, sometimes aided by the media, has led to the frequent characterisation of environmental issues as adversarial confrontations between manufacturers and public interests. This has served to make everyone aware, though the time has perhaps now come to try to move towards a more dispassionate analysis of how best to spend our finite resources, and how to anchor those decisions in society's values.

In the recent words of Norman Lamont:

> ". . .there is too much short-termism, too much reacting to events, not enough shaping of events". "Far too many important decisions are made for 36 hours' publicity".

CHARACTERISTICS THAT TEND TO INCREASE ACCEPTABILITY OF A RISK	CHARACTERISTICS THAT TEND TO DECREASE ACCEPTABILITY OF A RISK
Voluntary	Involuntary
Familiar	Unfamiliar
Immediate impact	Remote impact
Detectable by individual	Non detectable by individual
Controllable by individual	Uncontrollable by individual
Fair	Unfair
Non catastrophic	Catastrophic
Well understood	Poorly understood
Natural	Artificial
Trusted source	Untrusted source
Visible benefits	No visible benefits

Figure 1: Psychosocial and Cultural Characteristics Affecting the Perception of Risk. Slovic et al. (1979) Rating the risks, Environment, 21:14-20, 36-39.

RISK ASSESSMENT STAGES

1. Hazard identification.
2. Dose-response.
3. Exposure assessment.
4. Risk characterisation.

Figure 2: Four Stages of Risk Assessment

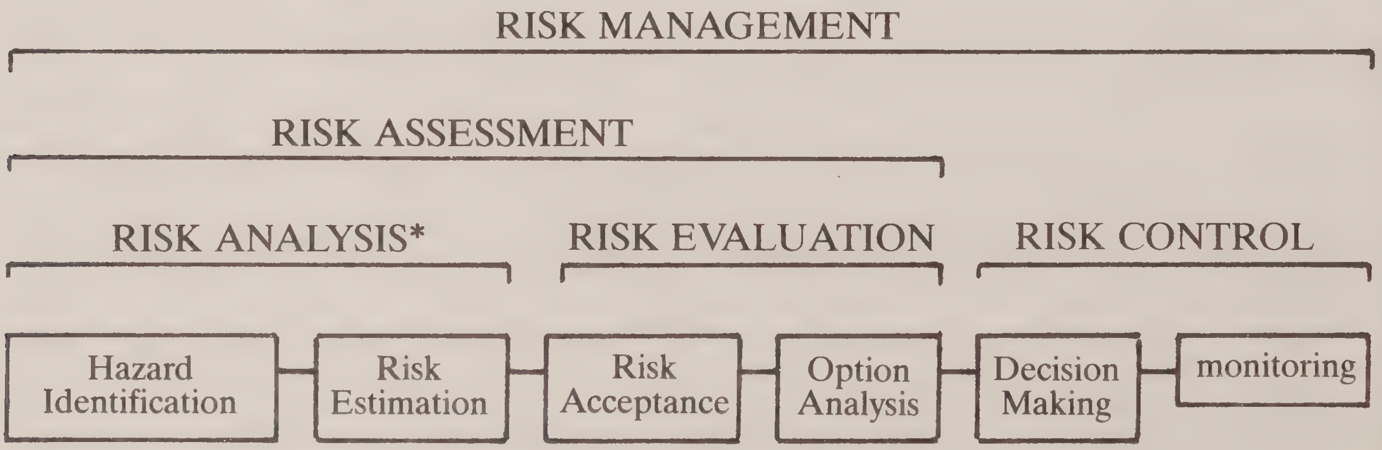

Figure 3: Risk Management Process.

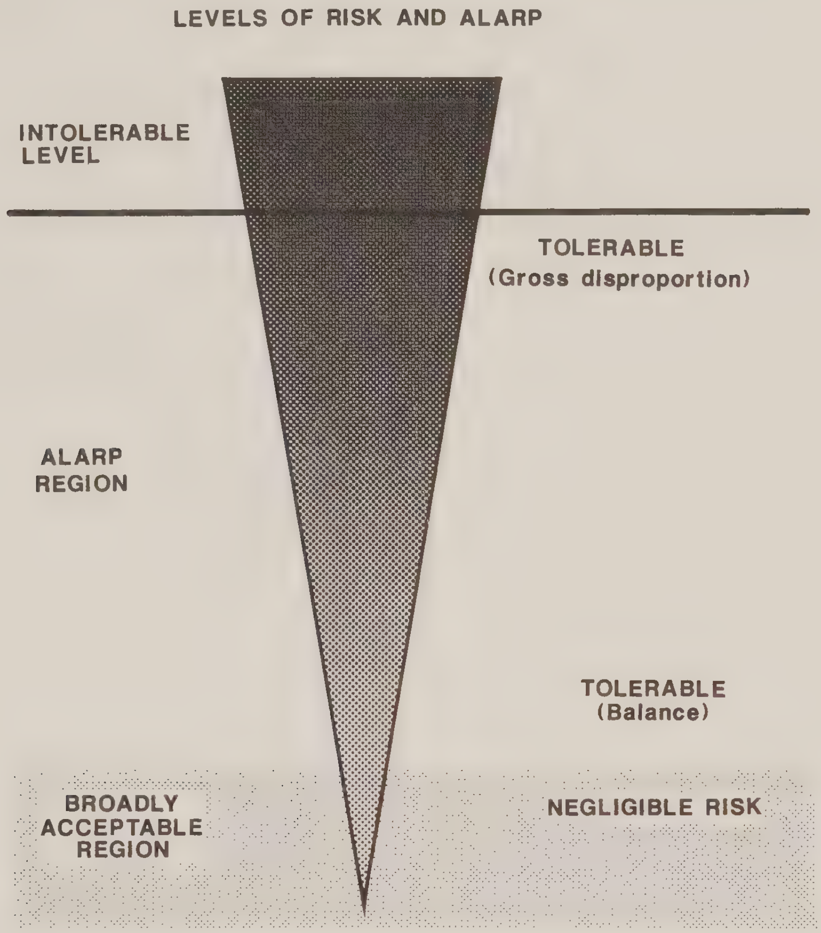

Figure 4: The ALARP Principle

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UPDATE

CROP BURNING BANNED

Regulations implementing the ban on straw and stubble burning and other crop residues in England and Wales finally came into force on 29 June. These ban the burning of cereal straw and stubble and the residues from oilseed rape, field beans and peas harvested dry except if required to do so under a Notice served under Plant Health Legislation.

The burning of linseed residues is permitted for a further three years; this will be reviewed following the 1995 harvest in the light of availability and practicability of alternative methods of disposal and the level of public complaint. Broken bales, the remains of straw stacks and other crop residues not mentioned in the Regulations may be burned subject to compliance with conditions in the Regulations and Schedule 2 of them — these remain much the same as in the 1991 Regulations which are now revoked.

The maximum penalty for breaching the Regulations is currently £5,000.

The Crop Residues (Burning Regulations) 1993 (SI 1336) are available from HMSO, price £1.10. MAFF has also published a guide to the new Regulations which is available free from MAFF Publications, London SE99 7TP; tel: 081-694 8862.

DOE STATISTICS

The Department of Environment's annual *Digest of Environmental Protection and Water Statistics* covering 1991 was published in May. Main points of interest are noted below:

- sulphur dioxide emissions fell six per cent over 1990 to 3.56 million tonnes; this represents a fall of 27 per cent over 1981 levels thus putting the UK ahead of its target of 20 per cent reduction by 1993 on 1980 levels as required by the Large Combustion Plants Directive.
- emissions of black smoke increased by five per cent in 1991 to 498 thousand tonnes — still significantly lower than 1986's high of 574 thousand tonnes which followed the miners' strike. The biggest cause of black smoke emission now is road transport which accounted for 208 th. tonnes of the total — a rise of 86 per cent between 1981 and 1991.
- following a slight increase in 1990, emissions of nitrogen oxides fell in 1991 to below the 1989 level at 2,747 thousand tonnes; again road transport accounts for a significant proportion of emissions (1,400 th. tonnes) — a rise of 73 per cent since 1981.
- road transport is again the culprit in accounting for 89 per cent of carbon monoxide emissions in 1991; total emissions at 6,735 thousand tonnes were higher than 1990 but lower than 1989's total of 6,808 th. tonnes.
- eight out of eleven monitoring sites recorded poor (i.e. between 125 and 399 ppb) levels of sulphur dioxide on three or more days during 1991; all the urban monitoring sites recorded poor (100-299 ppb) levels of nitrogen dioxide during 1991, with the three London sites recording very poor (> 300 ppb) on two days. Poor (i.e. 90-179 ppb) levels of ozone were recorded at five (out of 17) sites in 1991.
- noise complaints to environmental health departments in England and Wales rose a massive 40 per cent in 1990/91 to a total of 136,609; nearly 32,000 were confirmed as being a statutory nuisance; the main source of complaint is noise from domestic premises followed by noise from industrial and commercial premises. In Scotland noise complaints rose by 8 per cent between 1990 and 1991 with noise from industrial and commercial premises, followed by noise from domestic premises being the main sources.
- annual waste arisings are estimated at 402 million tonnes of which 20 m. tonnes is household waste and 80 m. tonnes is agriculture waste. Special waste arisings fell in England and N. Ireland but rose in Scotland and Wales. Imports of hazardous waste rose in England and Wales and in Scotland but none was exported. N. Ireland neither imported nor exported any hazardous waste in 1991/2.

RCEP FAVOURS INCINERATION

In its 17th report, *Incineration of Wastes*, published in May, the Royal Commission on Environmental Pollution (RCEP) called for a national strategy for waste management, which gives priority to creating less waste, recycling as much of it as possible, and recovering energy from what remains. While welcoming the considerable increase in the efforts devoted to waste minimisation and the recycling of materials since its 1985 report on waste management, RCEP suggests that for the foreseeable future, there will continue to be large amounts of household waste requiring disposal. "Incineration under carefully controlled conditions is likely to represent the best practicable environmental option for such wastes".

Because of public concerns about some older plants incinerating chemical wastes, the Royal Commission reviewed the evidence about possible health effects from those plants before they were either closed or modified. None of the independent studies carried out found any significant effects on the health of the population. There are some remaining uncertainties about these older plants, but these are not directly relevant to the future use of incineration because emission levels were far higher than will be allowed in future.

The Royal Commission recommends that a site-specific assessment should be carried out before a new incinerator is authorised, so that local conditions can be taken into account. To allow for more extensive use of waste incineration in future, it also recommends measures to reduce heavy metals in wastes and prevent the amounts present from causing environmental harm. These include a recycling scheme for batteries containing mercury or cadmium. The Royal Commission would favour further tightening of some of the standards for emissions of acidic gases, such as nitrogen oxides.

The RCEP concludes that incineration is an efficient way of recovering the energy present in household wastes, in order to generate electricity or provide steam or hot water. Because it prevents the wastes from decaying and producing methane gas it can also help significantly in countering the greenhouse effect. Compared with untreated household wastes, the residues left after incineration take up much less space and are much more stable. Incineration of household wastes is therefore environmentally preferable to tipping them, untreated into a landfill site.

NSCA welcomes RCEP report — see this issue of *Clean Air,* NSCA News.

INCREASE IN CHILDHOOD RESPIRATORY PROBLEMS

Research carried out by a team working jointly at the Royal Free Hospital School of Medicine and St. George's Hospital School of Medicine, London, shows that despite a reduction in the levels of air pollution, there have been marked increases in the occurrence of some respiratory symptoms in children since the mid 1960s.

The study which looked at a total of 2,323 children attending primary schools in Bath, Burnley, Chelmsford, Esher, Leatherhead, Port Talbot, Rhondda, Rochdale, Tunbridge Wells and Wigan, showed that the increase in the occurrence of symptoms was greater in Northern England and South Wales than in Southern England. The results of a questionnaire asking parents about their children's respiratory symptoms in 1990 were compared with results of a survey conducted in similar parts of the country in 1966. The study looked at each child's history of day and night-time cough, phlegm and wheeze, and a measurement of lung function using a peak flow meter.

The research team's findings are consistent with those of other surveys suggesting that wheeze in childhood (an important symptom of asthma) is becoming more common. The team also found that cough and phlegm unexpectedly have become more common over a period when levels of air pollution have fallen, and that the changes in respiratory symptoms are more marked in the north than the south. If further research confirms these results, it would suggest that factors such as airborne allergens or other irritants could account for persisting cough and phlegm in childhood.

The Ten Towns Study was carried out with the support of the Medical Research Council and the Coronary Artery Disease Research Association (CORDA), and is published in Volume 68, no. 6 of *Archives of Disease in Childhood* (June 1993).

AIR POLUTION AND TREE HEALTH

A recent report from the Terrestrial Effects Review Group has concluded that in some areas of the UK, it is likely that the pollution climate could contribute to tree damage. This conclusion is based on the review of the latest experimental evidence, improved data on observed pollutant concentrations, especially ozone and acid mists and the annual tree health survey data produced by the Forestry Commission.

Trees in the UK are damaged by a wide variety of agents such as wind, frost, drought and pests. There is some experimental evidence that air pollution can alter the sensitivity of trees to some of these agents and may also directly affect others. Consequently an indirect influence of atmospheric pollutants cannot be discounted in many of the reported cases of tree damage.

The report notes that forest soils in some areas of the UK have been acidified by the deposition of air pollutants. However the long term aspects of this acidification, e.g. nutrient uptake imbalance, fine root and mycorrhizal damage etc, are still not fully understood and need to be addressed further.

The report also illustrates the difficulties in assigning causes to tree damage, but it is hoped that as improved data on national air pollution concentrations and tree health become available, a clearer and more quantified picture of the relationship between the two will emerge.

Air Pollution and Tree Health in the UK is available from HMSO, £20.00.

AIR POLLUTION INFORMATION

A survey carried out by Friends of the Earth Scotland and the Scottish Consumer Council reveals both knowledge and practice in dealing with requests for access to air pollution registers to be patchy. Under Part I of the EPA, information and documentation relating to authorisations from the local authority must be put on a public register, thus members of the public can find out what steps companies are taking to minimise pollution and whether they are complying with all the conditions attached to their authorisation to operate. SCC and FoE volunteers who visited District and Islands Councils in Scotland to consult the registers holding this information often found access was not straightforward.

For example, although volunteers found that most staff had a high level of awareness about the legislation, some were vague and unsure about rights of public access. Some refused access altogether and some councils charged prohibitively high rates for photocopies of entries in the register — in one case, the council has said it will be charging £5 per page.

The survey also found that:

- Only about 50 per cent of Scottish businesses in Block 1 which had to apply for authorisations had done so by the required deadline of 31 July 1992;
- Some 24 per cent of Scottish businesses had still failed to apply 6 months after the deadline;
- About 50 per cent of Scottish local authorities visited by volunteers for the survey were unable to produce the required public register of applications of air polluting processes. Nine local authorities had not set up registers as no applications had been received, two would not give the volunteers access, one couldn't find the register and four had not set up registers despite having applications.

Thirty-nine District and Islands Councils were visited by volunteers and replies to follow-up questionnaires were received from 53 of the 56 councils.

As a result of the research which was circulated to Scottish local authorities, several Councils have already amended their approach to dealing with public enquiries; in addition Friends of the Earth Scotland has secured a grant of £50,000 to carry out a three year training programme to improve public scrutiny of environmental information held by offical bodies.

CARBONFLO

Carbonflo UK Ltd, manufacturers of a device of the same name and Douglas K. Childs (Managing Director) have been fined a total of £4,000 after Walsall Trading Standards took them to court for misleading advertising. Trading Standards Officers had the device tested at the Motor Industry Research Association who found that claims of fuel savings of between 8-12 per cent and an average 50 per cent reduction in carbon monixide emissions were incorrect.

UNEP DIRECTOR

Ms Elizabeth Dowdeswell has succeeded Dr. Mostafa Tolba as Executive Director of the UN Environment Programme. Ms Dowdeswell, who is Canadian, was Canada's Deputy Minister of Environment. She was also co-chair of the IPCC working group on mechanisms during the negotiations which led to the Framework Convention on Climate Change.

ENVIRONMENTAL LAW FOUNDATION

Co-founders of the ELF, Martin Polden and Diana Schumacher, visited NSCA recently to describe the ELF's work and to discuss mutual areas of interest. ELF was founded in January 1992 and through its network of lawyers and other experts and specialists provides advice, and indeed practical help, on cases of an environmental nature in the UK. (See also Clean Air, Spring 1992).

The ELF has now processed some 300 cases; initial assessment is carried out by an ELF member on a pro bono basis and thereafter it is aimed to keep fees to legal aid levels. A significant proportion of the ELF's initial casework has related to building developments (31 per cent) seen by local residents to pose a threat to the local environment. Cases relating to noise and air pollution also feature significantly — 14 and 15 per cent respectively.

The ELF is now looking for funding to enable it to expand its activities to include a regular newsletter or bulletin and to hold seminars and conferences. Membership of the ELF is open to legal practitioners, academics and others interested and experienced in environment-related issues.

For more details contact the ELF at Lincoln's Inn House, 42 Kingsway, London WC2B 6EX; tel 071-404 1030; fax 071-404 1032.

CLEAN AIR ACT 1993

With the coming into force of the 1993 Act on 27 August, the 1956 and 1968 *Clean Air Acts* will finally be repealed. Among other repeals are sections 75-84 of the *Control of Pollution Act 1974* and the whole of the *Control of Smoke Pollution Act 1989*. The 1993 Act is a consolidating measure and thus does not amend the existing legislation except for purposes of clarification or consistency of approach.

Copies of the 1993 Act can be obtained from HMSO, price £7.70.

PARTNERSHIPS FOR CHANGE

As part of its follow up to the 1992 Rio Earth Summit, the UK Government is organising a major international conference in Manchester from 20-22 September. The aim is to bring together NGOs from all over the world to exchange experiences of sustainable development solutions. A prime focus will be examples of partnerships within and between different sectors including business and industry, environment and development groups, local authorities and local communities. Output from the Conference will include a *Partnerships in Practice Guide.*

The Department of Environment is commissioning case studies looking at various examples of partnerships for sustainability around the world; these will be used in the discussions at the conference which will be grouped around three major themes: sustainable communities, sustainable enterprise and sustainable citizenship.

For more information contact Helen Jones, Room A302 at the DOE, Romney House, 43 Marsham Street, London SW1P 3PY; tel 071-276 8168; fax 071-276 8861.

Manchester is also the venue for the Global Forum 94 conference being organised by Manchester City Council in June 1994.

DOE INFORMATION

The Department of Environment has recently published two information leaflets, both of which are available free by writing to the DOE at PO Box 151, London E15 2HF, or Fax 081-533 1616.

Smoky Diesels

Published jointly with the Department of Transport, this leaflet explains the existing arrangements for members of the public to report excessively smoky heavy goods and public service vehicles (i.e. lorries, coaches and buses) to the Vehicle Inspectorate Enforcement Group Offices. It also contains advice on the steps which car drivers can take to reduce emissions from their vehicles.

To complement this leaflet, one entitled *Smoky Diesels: Advice To Operators* is being distributed to all individual operators of HGVs and PSVs, explaining the public's right to report excessively smoky heavy vehicles and what operators can do to help keep emissions to a minimum.

Barking Dogs

Constant Barking Can Be Avoided is produced in association with the National Dog Wardens Association and the Association of Pet Behaviour Counsellors.

Dog barking accounts for about one-third of noise complaints from domestic premises; in law a barking dog can be a noise nuisance and the owner can be taken to court if he or she does nothing to stop the nuisance. The new leaflet gives simple and positive ideas for dealing with a dog that barks, and explains where dog owners can obtain further help. It is being widely distributed to local authorities and complements the leaflet *How To Be A Responsible Dog Owner* which the Department produced last year.

Air Quality Card

Also available free from the Department of Environment is a plastic card (credit card size) giving the air quality freephone number, plus the Ceefax and Teletext pages on which the information is given. Write to the DOE at PO Box 151, London E15 2HF for copies of the card.

BOOKS AND REPORTS

CLEANER PRODUCTION WORLDWIDE

United Nations Environment Programme, Industry and Environment Programme Activity Centre, 1993. ISBN 92 807 1369 8.

This booklet has been produced for UNEP by the Department of Environment and stems from a workshop held in Paris in 1991 on country specific activities promoting cleaner production. It aims to show through examples that by applying cleaner production, industry and consumers anywhere in the world can gain environmental benefits while reducing costs. Examples of cleaner production techniques include minimising of organic solvents in degreasing and painting (Sweden), chrome recovery and recycling in the leather industry (Greece), galvanising of steel (France), de-inking process for waste paper (UK). An outline of the process is given, together with contacts for following up.

CITY AIR QUALITY TRENDS

United Nations Environment Programme and World Health Organisation, 1992. Available from UNEP, GEMS Programme Activity Centre, PO Box 30552, Nairobi; or WHO, Prevention of Environmental Pollution, 20 Ave Appia, Geneva 27.

This report is the first of a series presenting data on levels and trends of urban air pollutants in ten cities which are participating in the Global Environment Monitoring System

(GEMS) Air programme. Monitoring data for levels of sulphur dioxide and particulates are assessed and compared with the WHO guideline values for health effects. This first report covers Bangkok, Beijing, Bombay, London, São Paulo, Shanghai, Tehran, Tokyo, Wroclaw and Zagreb thus reflecting a wide range of climatic and socio-economic conditions. In most cases monitoring covers 1975-89 with only two cities — Tokyo and London — not violating long-term WHO health guidelines for either suspended particulates/smoke or sulphur dioxide.

URBAN AIR POLLUTION IN MEGACITIES OF THE WORLD

World Health Organisation and UN Environment Programme, 1992. Blackwell.

This report for the Global Environment Monitoring System (GEMS) provides a comprehensive overview of current levels of air pollution and trends in 20 cities worldwide all of which have, or are forecast to have, 10 million inhabitants by the year 2000. The report evaluates the significance of the pollutants from various sources. It notes that despite the introduction of management strategies, monitoring trends show that levels of most pollutants are increasing, except for sulphur dioxide and lead. The report concludes that in many cities the ability to prevent air pollution lags behind its increasing impact on the human environment.

THE SITEFILE DIGEST

The Environment Press. 1993. Annual subscription £225. Details Guy Hibbert, 081-810 9979.

Loose leaf binder with quarterly updatings provides details on more than 6000 waste disposal sites in Britain. Information on landfill, incineration, transfer and treatment sites enables waste producers to identify which sites are approved for particular waste types; also includes details of local WRA, the person or organisation licensed to operate the site and other licence details.

ENVIRONMENTAL MANAGEMENT

Vol. 1, The Compartmental Approach, Vol. 2, The Ecosystems Approach, Vol. 3, Instruments for Environmental Management

Ed. B. Nath et al, Vubpress, 1993. ISBN 9054870338, 9054870346, 9054870354.

This is a three volume series aimed at presenting a comprehensive overview of environmental management — the first examines aspects of the environment, the second looks at individual ecosystems and the third at ways of implementing environmental management. Overall, the series provides a broad based and accessible introduction to the subject.

CAPITAL KILLER II

S. Bell, London Boroughs Association, 1993. £15.00. ISBN 1873745141.

This second LBA report reviews progress in curtailing London's traffic pollution since the initial report three years ago. It highlights the continuing need for an adequate monitoring network, and a reduction in vehicular traffic in London, and lists measures that Government and local authorities should take to achieve these.

HANDBOOK OF ENVIRONMENTAL MANAGEMENT AND TECHNOLOGY

G. Holmes et al, John Wiley & Sons, 1993. £62.00. ISBN 047158584X.

Divided into six parts, this book provides a general introduction to current issues and technologies which need to be considered. An overview of environmental issues is followed by sections on air pollution, water pollution, waste, and other considerations.

CAMPAIGNERS' GUIDE TO ROAD PROPOSALS

W. Sheate, M. Sullivan, CPRE, 1993. £10.00

This guide is aimed at steering local people through the procedures of objection to road proposals. It is written from extensive experience of the road enquiry system, and therefore has valuable insights for the novice objector. It provides practical and positive assistance, and is realistic about what can be achieved within the system.

ENVIRONMENTAL CHEMISTRY

S.E. Manahan, 5th Edition, Lewis, 1991. £24.95. ISBN 0873714253.

Suitable for undergradutes — or anyone with a basic grounding in chemistry, this volume provides an excellent introduction to all aspects of chemistry and the environment. Aquatic, atmospheric, soil and waste systems are covered in detail, and overview chapters look at global pollution problems and solutions, resources and energy.

RADIOACTIVITY AFTER CHERNOBYL

Biogeochemical Pathways of Artificial Radionuclides

Ed. F. Warner and R. Harrison. John Wiley, 1993. £75.00. ISBN 0471931683.

The findings of this book are based on research from fourteen nations, following a series of workshops. It looks at the most significant pathways of man-made radionuclides. The importance of discharges from waste and accidents is put into perspective and environmental effects are assessed.

WATER POLLUTION: FINDING THE FACTS

M. Taylor, Friends of the Earth, 1993. £2.95. ISBN 1857502159.

A guide aimed at helping people to find out about water quality. It looks at public registers and where to find them and how to interpret data and current legislation. Background information on water pollution is also provided, to enable the reader to pursue any issues arising from their investigations.

COMPOST

Friends of the Earth, 1993. £11.95. ISBN 1857501454.

A guide for local authorities, aimed at assisting them in meeting the Government's recycling target by composting organic waste. It covers information on the law, possible schemes, promoting home composting and case studies.

SITE SELECTION FOR NEW HAZARDOUS WASTE MANAGEMENT FACILITIES

W. Sloan, WHO, 1993. Sw.fr. 21.00. ISBN 928901309.

This publication outlines the processes involved in selecting appropriate sites for hazardous waste management. It advocates the necessity for public support and acceptance if a facility is to be sited successfully. Practical examples of the use of recommended consultation processes are included.

REMEDIAL PROCESSES FOR CONTAMINATED LAND

Ed. M. Pratt, Institution of Chemical Engineers, 1993. £23.00. ISBN 0852953100.

The chapters in the book are compiled from papers presented at a seminar. They cover current technologies and techniques used for decontaminating land – including soil washing, bioremediation, incineration and vacuum extraction.

ENVIRONMENTAL IMPACTS OF WASTE PAPER RECYCLING

V. Virtanen, S. Nilsson, Earthscan, 1993. £25.00. ISBN 1853831603.

A summary of a recent study on paper recycling in Europe. The entire production and disposal process is investigated using a life-cycle methodology. The results of the study reinforce the economic and environmental advantages of recycling, but also show that under some conditions energy recovery is a more attractive option.

WASTE, RECYCLING AND ENVIRONMENTAL DIRECTORY 1993

Thomas Telford, 1993. £40.00. ISBN 0727718445.

Divided into 68 sections, the directory includes waste facilities and services, recycling, cleansing and collection and consulting. It is indexed by trade names, company names and subject.

THE AMA AND THE ENVIRONMENT

AMA, 1993. £10.00. ISBN 1856770534.

This statement – subtitled 'building partnerships for the environment' – describes the main strands of the AMA's current position on environmental policy.

ENVIRONMENTAL POLLUTION CONTROL

An Introduction to Principles and Practice of Administration

J. McLoughlin, E.G. Bellinger, Graham and Trotman, 1993. £63.00, ISBN 1853335770.

Intended as an introductory text for administrators inexperienced in the field, the book introduces a variety of ways in which environmental management can be achieved. An initial overview covers administration systems, control techniques and enforcement. Examples of practice are then taken from the UK, USA, Sweden, Denmark, France, the (Federal Republic of) Germany and New Zealand.

ENVIRONMENTAL PROFILES
A Global Guide to Projects and People

Ed. L.S. Katz et al, 1993. $125.00. ISBN 0815300638.

A somewhat selective directory which lists a peculiar mixture of NGOs, private consultancies and academic bodies.

ENVIRONMENTAL INFORMATION
A guide to sources

N. Lees, H. Woolston, British Library, 1993. £25.00. ISBN 0712307834.

An evaluative survey of sources of environmental information. Arranged by subject each chapter gives a brief introduction and lists databases, printed material and organisations.

BRITISH STANDARDS

The following British Standards have been published recently; they are all available from BSI Publications, Linford Wood, Milton Keynes, MK14 6LE.

Water Quality

BS EN 29888: 1993 — Water Quality — Evaluation of the aerobic biodegradability of organic compounds in an aqueous medium — Static test (Zahn Wellens method). £29.00.

BS EN 29408: 1993 — Water Quality — Evaluation in an aqueous medium of the 'ultimate' aerobic biodegradability of organic compounds: method by determining the oxygen demand in a closed respirometer. £41.60.

BS EN 29439: 1993 — Water Quality — Evaluation in an aqueous medium of the 'ultimate' aerobic biodegradability of organic compounds: method by anylysis of released carbon dioxide. £41.00.

BS EN 26461 — 2: 1993 — Water Quality — Detection and enumeration of the spores of sulphite reducing anaerobes *(clostridia)*, £23.60.

BS EN 26461 — 2: 1993 — Method by membrane filtration, £23.60.

Air Quality

BS 6069: Section 4.4:1992 — Determination of the mass concentration of sulphur dioxide — Performance characteristics of automated measuring methods.

FUTURE EVENTS

6-8 SEPTEMBER — COMMUNICATING ENVIRONMENTAL POLICY
This short course and workshop programme is aimed at those whose job-functions require them to communicate the organisation's environmental policies, plans and performance both to employees and the outside world. Participants will be introduced to the economic, political and social factors which generate regulations; the institutions which set the agenda for environmental action; and gain an insight into how the media report environmental issues.
Venue: City University, London EC1.
Details: Bebe Balban. Tel: 071 477 8221.

13-15 SEPTEMBER — INDUSTRIAL AIR POLLUTION MONITORING
A short course covering currently available techniques for emissions monitoring. The course has now been extended to include the associated issues of quality control, data handling and management of sampling programmes. The course will be of interest to those responsible for emissions testing on a contract basis, manufactureres of pollution control equipment and those in local authorities with responsibilities towards Schedule B processes under the *Environmental Protection Act 1990.*
Venue: University of Leeds.
Details: Julie Charlton, University of Leeds. Tel: 0532 332494.

13-16 SEPTEMBER — IEHO ANNUAL CONGRESS
Main sessions will cover housing, occupational health, food and environmental protection.
Venue: Wintergardens, Blackpool.
Details: Catherine Gibbs, IEHO. Tel: 071 928 6006.

14-15 SEPTEMBER — COMPETING FOR WARMTH
Neighbourhood Energy Action's annual conference. Issues to be looked at include VAT on domestic fuel bills; who benefits from competition in the fuel industry; competing priorities in energy efficiency.
Venue: Manchester.
Details: Trish Bell. Tel: 091 261 5677. Fax: 091 261 6496.

20-22 SEPTEMBER — PARTNERSHIPS FOR CHANGE
International conference hosted by UK Government aimed at making some of the promises made at the Earth Summit in Rio a reality. This conference will bring together invited NGOs from all over the world to exchange experiences of sustainable develop-

ment solutions. Partnerships within and between the various sectors — e.g. business, local authorities, local communities — will be studied.
Venue: Manchester.
Details: Helen Jones, DOE, Tel: 071 276 8168. Fax: 071 276 8861.

20-23 SEPTEMBER — ENVIRONMENTAL IMPACT ASSESSMENT OF ALL ECONOMICAL ACTIVITIES

This conference is organised by the Czech Government, a number of Czech academic and industrial bodies and the UK's Rendel Science and Environment. It will focus on assessment of the current environmental conditions of the industrial and economic development in Eastern Europe. Practical steps needed to restore the environment to an acceptable level will also be discussed.
Venue: Czech Technical University, Prague.
Details: Prof. Ing. L. Végh. Tel/Fax: + 422 781 1674.

20-21 SEPTEMBER — EUROPEAN ENVIRONMENT CONFERENCE

The conference will address key issues in European environmental policy including developments in EC Environmental Policy and Law, global environmental change, local authorities and the environment, business and the environment, central/eastern Europe, waste management, clean technologies, conservation and biodiversity, transport, energy and environmental economics.
Venue: University of Bristol.
Details: Conference Organiser, European Research Press. Tel: 0274 729315.

21 SEPTEMBER
THE ENVIRONMENT AGENCY — AGENTS FOR CHANGE

NAWDC's 4th annual conference will focus on three key issues affecting the waste management industry — the Government's proposals for the Environment Agency, implementation of the new licensing system and the likely impact of economic instruments.
Venue: Queen Elizabeth II Conference Centre, London SW1.
Details: Claire Foxley, Event Planners. Tel: 071 602 8115.

21-22 SEPTEMBER — 1st INTERNATIONAL CONFERENCE ON ENVIRONMENTAL ENGINEERING

Areas to be covered by conference papers include waste management, building, noise, water, energy efficiency, filtration, education and engineering.
Venue: De Montfort University, Leicester.
Details: Marketing Centre, De Montfort University. Tel: 0533 577355.

23-24 SEPTEMBER — BUSINESS STRATEGY AND THE ENVIRONMENT

The 2nd annual Business Strategy and the Environment Conference will look at effective responses to the environmental challenge demanding a long term strategic approach from industry. Due to the increasing pressures being placed on the environment, industry is being encouraged by all of its stakeholders to improve environmental

performance; from government and regulators to customers and the general public.
Venue: University of Bradford.
Details: Conference Organiser, European Research Press. Tel: 0274 729315.

4-7 OCTOBER — ENVIRONMENTAL PROTECTION 1993
NSCA's 60th annual conference will look at the changing pattern of environmental protection. Attention is moving from single-issue questions to the integration of environmental objectives into planning and management decisions at national, local and individual level. Areas to be covered will include experience in environmental planning and management, conserving land, water and energy, noise, and air quality for health.
Venue: Brighton Centre.
Details: NSCA. Tel: 0273 326313.

12-13 OCTOBER — THE ENVIRONMENT IN TURMOIL
Enviroscot '93 will examine the economic and commercial realities faced by the waste management industry at a time of continuing change and increased legislation. The conference will cover a wide range of environmental and waste management topics including landfill pricing policy, recycling and waste disposal options.
Venue: Moat House International Hotel, Glasgow.
Details: Elaine Robertson, Meeting Makers Ltd. Tel: 041 553 1930.

30 NOVEMBER — SAFE STORAGE OF HAZARDOUS SUBSTANCES
This one day course will deal with the range of hazards that can be present in chemical storage, legal requirements, and administrative and engineering control to minimise risks. The course is aimed primarily at managers of organisations concerned with the storage of chemicals and hazardous substances, also safety representatives, company technical staff, staff of local authorities who are concerned with industrial planning, staff of enforcing bodies and Fire Services who are involved with advising on safe storage of hazardous substances.
Venue: University of Sheffield.
Details: Maria Elliott, University of Sheffield. Tel: 0742 768653.

1993 NSCA POLLUTION HANDBOOK

The NSCA Pollution Handbook has been described as **the best one-stop-shop** guide to pollution law. Widely used by government departments, HMIP, local authorities, industry and environmental consultants, it covers the whole of UK and European pollution legislation on air, water, waste and noise in an up-to-date and accessible form.

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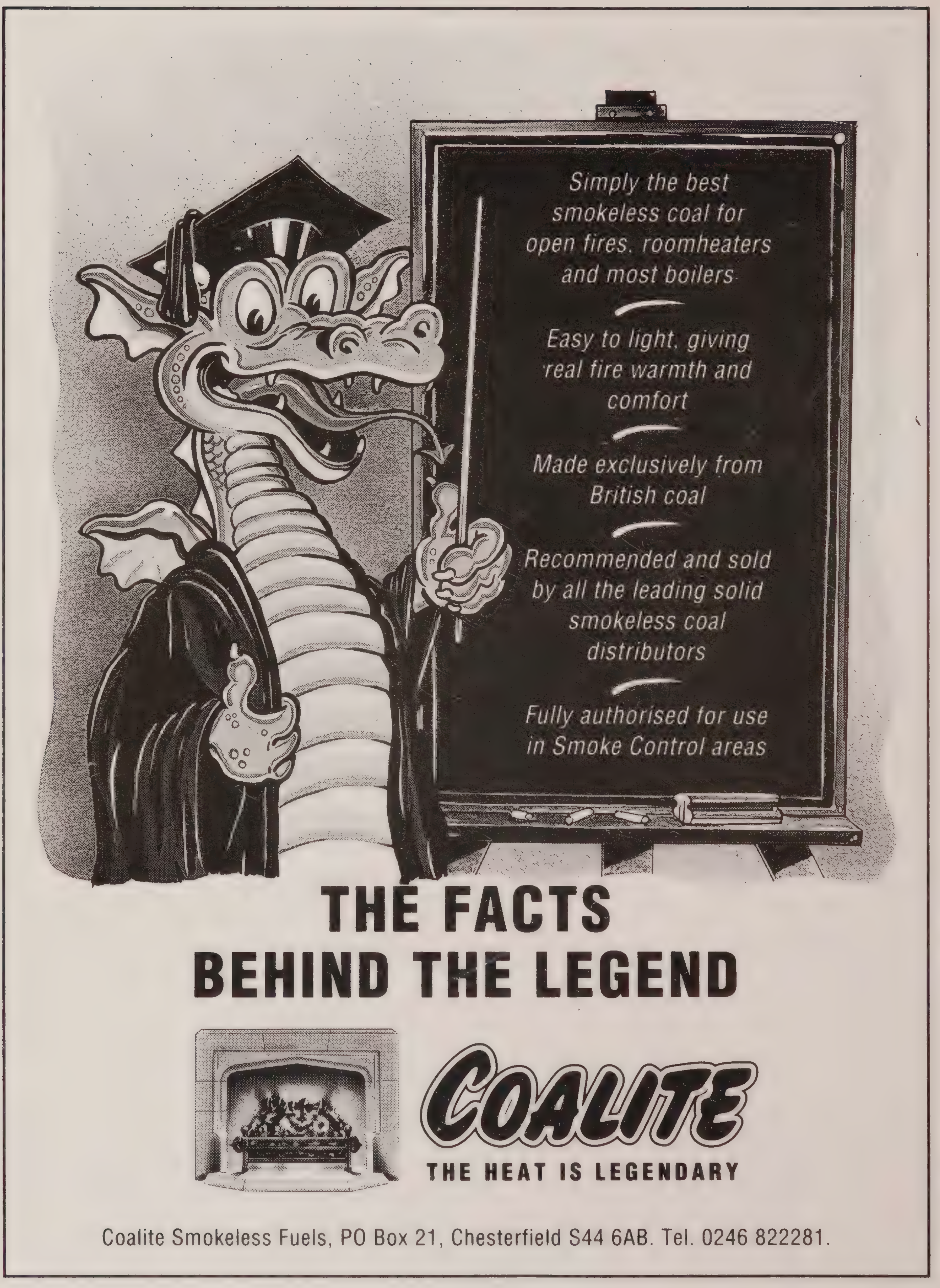

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CONTENTS

Editorial 107

NSCA Views
— UK Strategy for Sustainable Development 109
— Proposal to Repeal Provisions of the Clean Air Act 1993 115
— Paying for Better Motorways 118
— Derogation for HGV Manufacturers 120

NSCA News
— Local Authority Air Pollution Monitoring: NSCA Survey 121
— South East Division 129

Reports
— HMIP Seminar on Environmental and Economic Assessments for IPC: Ken Gregory 130
NSCA's Preliminary View 133
— Assessing the Impact of Air Pollution on the Natural Environment: Andrew Farmer, English Nature 134
— Tobacco Advertising: Action on Smoking and Health 137

Update 139

Books and Reports 143

Future Events 147

Advertisers
— Coalite Smokeless Fuels cvr iii
— Enviro Technology Services Plc cvr iv

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EDITORIAL

HOW FAR HOW FAST?

Annual Conference is an exciting and challenging time for the Society. Principles which have been developed in cosy isolation are tested against reality. Policies and plans for single issues in environmental improvement are reconciled with wider environmental, economic and social objectives. The contributions of armchair philosophers are matched with those from the frontline. Grand visions emerge.

Each year the challenge becomes more complex. More and more factors have to be accommodated to inform rational decisions. For each environmental issue it becomes ever more important to know the answer to three key questions:

- what environmental quality actually is?
- what is a sensible target for improvement?
- how and when should we realise that target?

The widening challenge was demonstrated by the range of professionals on the platform in Brighton. Science, medicine, economics and engineering were invoked to address the three key questions in both environmental planning and management perspectives and always against a realistic appraisal of public expectation.

There was also a realistic appreciation that we do not often have the leisure to address the three questions sequentially. The fine judgements which are necessary to fix the degree of precaution which is appropriate to circumstance was illustrated over and over again. In Hertfordshire for example measures are being introduced to promote and enable independence of the car. Action is in hand despite the lack of an unambiguous relationship between air pollution and specific health effects which many would see as a prime justification for the move.

Debate in Brighton highlighted the fact that precautionary judgement on acid rain is also fraught. International agreement on quotas for sulphur emission is likely to be blocked not so much by technical argument about the considerable uncertainties in predicting sulphur deposition and its effects, but more by disagreement on the economic burden of alternative abatement strategies. Public understanding of the economic, social and environmental implications of the options in acid rain which are on the table in Geneva is poor. It is a major challenge to the Society to develop coherent and comprehensive policy in this area and explain it to a wider audience.

The Society looks to Government to secure a framework which ensures that rational action by individuals, public bodies and competitive businesses delivers sustainable quality of life and environmental protection. We are looking for legislation which means that decisions are taken by those best informed for the task. We are looking for financial measures which are aligned with the grain of environmental protection. And we are looking for better awareness of the issues so that a near universal wish for a better environment can be translated firstly into an informed will for improvement and then into enlightened action.

Of course it is not sufficient to merely look for improvement. We must contribute to it constructively. We must ensure that the breadth and quality of argument which we experienced in Brighton is reflected, refined and developed throughout the year in Divisions and Standing Committees, in our relations with other organisations and in our research. The breadth and expertise of our membership means that we are better placed than most to help Government determine how far and how fast we protect the environment.

NSCA 1994 NATIONAL EVENTS

Wednesday 16 February
Policy Seminar
Neighbour Noise Control - What Next?
NEC - Birmingham

Wednesday 13 & Thursday 14 April
Spring Seminar
Characterisation and Management of Air Quality
Milton Hill House - Abingdon

Thursday 2 June
Training Seminar
NEC - Birmingham

Monday 24 to Thursday 27 October
Environmental Protection 94
61st Annual Conference and Exhibition
Blackpool

NSCA VIEWS

UK STRATEGY FOR SUSTAINABLE DEVELOPMENT

Department of Environment
Consultation Paper, July 1993

One of the main driving forces behind last year's Earth Summit in Rio was the 1987 World Commission on Environment and Development report *Our Common Future* — The Brundtland Report. This emphasised the importance of "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" — i.e. sustainable development.

Among the many initiatives agreed by governments worldwide at Rio was Agenda 21; this is a huge document which sets out an "environmental work programme" into the 21st century. It also calls on governments to prepare national strategies for sustainable development.

In preparing the UK's outline Strategy (on which NSCA's comments follow), the Department of Environment has held a number of meetings and, on the basis of the results to this consultation exercise will be producing a detailed plan by the end of the year.

NSCA's COMMENTS

Managing the transition to sustainable development is perhaps the most demanding challenge faced by individuals, communities and nations. Misjudgment of the timing and direction of change could damage the UK environmentally, economically, and in terms of quality of life and heritage. The Society therefore welcomes the discussion paper and has participated in some of the roundtable meetings convened by DOE. However we are disappointed that the Government appears to underestimate the urgency of the issue, its own unique role in the process, and the complexity of the task ahead. Thus our comments relate to the limited scope of the proposed UK Strategy; to the apparent unwillingness of the UK Government to play a full role; and to some of the elements we believe are necessary for the potential of the Strategy to be realised.

1. A Narrow View

As the spotlight moves away from last year's Earth Summit, the consultation paper provides disappointing evidence that the issue of sustainable development is being politely but firmly sidelined by the UK Government. Despite earlier welcome commitments to action by Green Ministers, the paper shows little evidence of a real will to weave the thread of environment into the cloth of economy and society.

Sustainable development is about more than environmental impact yet, perhaps because the task of drafting has fallen to the Department of the Environment, the document has an underlying environmental bias. Social, environmental and economic objectives must be equal partners if patterns of sustainability are to be attained, and it would be foolhardy to believe that they will be attained without profound and pervasive change. To a greater extent than for most issues, the pursuit of sustainable development will require commitment and action by all members of cabinet. The Secretary of State should tell cabinet colleagues what a sustainable environment would look like, but it would be for his colleagues in other spending Departments to decide the economic and social policies which would deliver them. In particular it should fall to the Chancellor of the Exchequer to agree the ultimate balance sheet and for the Foreign Secretary to secure acceptance and deliver obligations on the international stage.

Instead, sustainable development is seen as the province of a Department relatively low in the Whitehall pecking order. In drafting this paper, DOE has undertaken a lot of hard work and creative thinking, produced draft chapters for a report, and then watched other Departments eviscerate them.

The document lacks any view of what a more sustainable society would look like in twenty years time, and beyond. While a bias towards short-term policy considerations may be inherent in all political systems, the consultation paper also reflects the reluctance of the present administration to intervene in markets, and a post-Rio slump in political interest.

Without a future vision — and an analysis of its implications for economic activity, sector by sector — it will be impossible to guide the choices which will create a more sustainable lifestyle. Many planning decisions and policy choices taken now will continue to have influence beyond the twenty year time horizon. The UK Strategy must reflect this, both by incorporating a rolling programme of interim reviews leading up to 2012, and setting broad longer term objectives.

The lack of any top-level political impetus results in a document which is strong on general scope and principles but weak on specifics. Considerable space is given to state-of-the-environment data already available elsewhere, but commitments to identifiable policy objectives and targets — and the mechanisms by which objectives and targets will be reached — are largely absent. The EC Fifth Environmental Action Programme, which does contain objectives and targets for sustainable development and which creates an important policy context for UK action, receives only grudging acknowledgement. Even the data coverage is uneven ignoring, for instance, methane as the second most important greenhouse gas.

The Society is also concerned to note the low priority given to noise in the draft. Noise has direct impacts on health and quality of life. It must be addressed in the planning process and environmental impact analysis; it is also an important indicator of environmental quality. Action must be taken now if we do not wish to pass on a noisier world to future generations.

2. Passing the Buck for Sustainability

The paper says little about the role of Central Government, preferring to concentrate on the roles of other players. NSCA believes that it is a basic responsibility of Government to lead, facilitate and monitor; to foster a framework in which the choices made by individuals and organisations result in patterns of consumption and behaviour which represent the best compromise between long-term social, economic and environmental interests, and which protect identified inviolable standards.

Subsidiarity demands that *local authorities* will have a major role in delivering sustainable development. They are keen to involve other local players through the development of local Agenda 21 programmes, but these can only take shape in the context of agreed national objectives. There is a need for greater flexibility for local strategies to implement national targets, and for stronger devolution of power from central to local government in order to achieve this.

Increasingly the *voluntary sector* is seeking partnerships to integrate environmental, social and economic interests, both at local and national level. Although Government applauds their activities, there appears a continuing reluctance to accept them as full partners.

For *industry*, the Government must set a framework where rational action by the competitive firm delivers sustainability. Clear and durable targets will give the stability which is needed to plan profitable investment and beneficial change. Voluntary action can only be relied upon where it serves the commercial interest. The Government alone can provide this necessary framework.

In the field of individual responsibility, reliance on voluntary action by the *public* is not enough and may be counterproductive. Those individuals who voluntarily limit their impact may leave more — roadspace, environmental carrying capacity, finite resources — for others to exploit. Government must seek a more optimal mix of education, regulation and fiscal incentives to influence individual behaviour.

Sustainable development does demand a partnership between all the players identified in the consultation paper, but the Government does not appear to recognise its unique fitness to coordinate and reconcile. Strong central leadership is required to draw together the threads of individual, local and sectoral action into a coherent national plan, together with a rolling programme to move to a more sustainable way of life and a system for monitoring our progress. The paper plays down the complexity of the task and the role which Government will have to accept if there is to be any chance of progress within the relatively short time available to get a national act together.

3. A Vision and a Coherent Framework

Despite the shortcomings of the current document and consultation process, the objective of trying to set out a strategy for sustainable development and consulting widely on it is welcomed. The UK is more advanced than many countries in the process and we have an opportunity to develop world leadership in addressing world problems.

We also welcome the identification of some key principles: establishing the need to consider the effect of UK policy on the global environment; accepting that changes in individual lifestyles are a necessary part of moving towards sustainability; calling for decisions to be based on the best possible economic and scientific analysis, including environmental appraisal and natural resource accounting or 'green accounts'. We would welcome a specific commitment to strategic environmental assessment of national Departmental policies.

Overall the document needs to convey a greater sense of the importance of the issues to assist all players to make the hard choices which a more sustainable lifestyle requires — to take responsibility for our environmental footprint. Having created a vision, the Strategy should be more prescriptive. Most people and organisations are willing to accept directions and, if necessary, restrictions so long as they are shown to be for a good reason and applied fairly.

The basis for action lies in agreement on environmental, economic and social objectives at individual, national and international levels, which are expressed in progressively more quantitative terms of scale and timing as consensus builds, and which together satisfy the perception of the day of sustainable development.

Certain minimum environmental standards should be identified as inviolable; above this an accord between social, economic and environmental objectives must be brokered. Emphasis should be given to objectives which address quality of life issues, and to the development of appropriate indicators to measure this. For example, in the transport sector, air quality and economic objectives must be weighed against social factors which are less easily measured — accessibility, community disruption, social equity, noise intrusion, etc.

The Society is most closely concerned with the identification of appropriate environmental quality objectives (EQOs). The assessment of actual environmental quality within geographic units of a size appropriate to the EQO concerned will then allow identification of the best means and rate of improvement where actual environmental quality falls short of EQOs, again having regard to economic and social costs and the diversity of views and objectives at levels from the individual to the global. The outcome of the process should be consensus on the improvements which would be best secured by change in each sector, and latitude to devise the most competitive means of implementing the necessary change. Arrangements would be revised as experience was evaluated; the speed of iteration will vary in response to new information and events. We would expect the Government to be guided by independent advice on such matters — a role which we have already identified for the forthcoming Environment Agency.

It would be naïve to expect to implement sustainability sequentially through central planning and direction. Instead we have to invoke subsidiarity, devising ways of parallel working by delegation and consensus reporting. We have also to build confidence in reliance on enhanced mutual understanding and appropriate reaction to the wider perceptions which result. To achieve this there is an enormous task of orchestration and adjudication which only Government can accomplish. EQOs will only be taken seriously in public and commercial planning if they carry the official stamp. The conceptual framework for sustainable development has little value without numbers. Annex A describes some ways in which numbers might be agreed for EQOs, current environmental quality and sectoral responsibilities for change.

The draft concludes that '. . .it is too soon to formulate conclusions as to the outcomes of the UK Strategy. . .' It is not however too soon to give leadership by setting out the scale of the issues, a vision, and some elements of the Strategy. The National Environmental Policy Plan (NEPP) produced by the Government of The Netherlands in 1989 provided a much more thorough strategy which worked out the details of different scenarios and set targets. The NEPP provides a useful model. We need to grow local solutions to global, Europe-wide and UK problems, and set out our approach of local action within a consistent national framework, and national targets.

4. Conclusions

The UK Sustainability Strategy is in danger of becoming a complacent restatement of environmental data and policies, rather than a visionary assessment of the nature of sustainable development and the technical, economic and social changes necessary to attain it. If this proves to be the case, it will have failed to live up to its potential and will be a source of bitter disappointment to all those who had hoped for a productive outcome from the Rio process.

What is needed is a technical, economic and social strategy which will deliver quality of life and sustainable environment. This requires:

- Clear targets, with recognition that they will need revision in the light of progress;
- The active and enthusiastic participation of the whole Government, holding the ring for wider discussion;
- Firm action by Government where unsustainable practice is not in the common interest.

The UK Government must show a readiness to listen and to act with a speed appropriate to the urgency of the threats we face. It will find many willing partners in ever-broadening alliances. The UK commitment to meaningful action will come under close scrutiny at next year's Global Forum; there is still time to show world leadership in facing the world's single most important challenge.

Annex A: Evaluating Current Environmental Quality and Agreeing Responsibilities for Improvement

In parallel with agreement on environmental quality, economic and social objectives we need to maintain an up-to-date assessment of the state of the environment and identify the natural and anthropogenic factors which are affecting it.

At national level *The UK Environment* provides a useful foundation which could be developed by the incorporation of an element of independent review.

In order to match environmental protection regimes more precisely to local circumstances, environmental quality should also be assessed at the sub-national level.

The NRA is making progress with a catchment management approach to water quality which is summarised in a strategy document published on 12 August. The assessments and plans which will emerge as a result of implementation of that strategy will enable responsibilities for rational environmental protection to be allocated to those who can meet them at least cost overall and enforced in a manner which is both fair and transparent.

So far as air is concerned NSCA is championing a more coherent approach to local air quality management. The basic elements for a given geographical unit would be an ambient air quality monitoring system, and inventory of point, diffuse and mobile air pollution sources and a predictive model. All components would be compatible and there would be quality assurance of data. The system would inform development planning, management of potentially polluting activities (including transport) and incident control. Since "airsheds" are less self-contained than watersheds, allowance would be made for transboundary movements of pollutants.

There was a very vigorous response to a NSCA workshop on this subject in the Spring. As a result the Society is setting up an information exchange network under the auspices of its Technical Committee. The network will help to define needs for guidance on local air quality management so that there could be local choice to achieve the mix of measures most appropriate to the circumstance of the locality. Such measures would enable a local air quality management plan. This would place the industrial contribution to air pollution in proper perspective alongside the contributions from agriculture, transport and the domestic sector. There would then be a level playing field for selection of the most cost effective measures to achieve particular EQOs.

Unlike the situation which prevails for the aquatic environment, none of the organisations currently earmarked for incorporation into the Environment Agency has a commitment to local air quality management, although HMIP has much of the relevant expertise. The remainder could be procured from consultancies. If industry is to have confidence that the air pollution control responsibilities placed upon it, within IPC or otherwise, are fair and reasonable Government should make a commitment to development of a more positive approach to local air quality management either through the Agency or by development of existing arrangements.

There are similar arguments in favour of relating the tolerable pollution burden for soils more precisely to conditions and setting priorities for clean up of the legacy of contaminated land. The NRA, the WRAs, Planning Authorities and MAFF amongst others are making a valuable contribution and the Agency will be well placed to secure further progress. However in the interests of brevity these possibilities are not explored here.

PROPOSAL TO REPEAL PROVISIONS OF THE CLEAN AIR ACT 1993

Department of the Environment, July 1993

In commenting on proposals to repeal various sections of the new *Clean Air Act 1993,* NSCA said that the consultation paper had drawn an unusually strong, and almost universally critical, response from the membership. Comments focused on two questions the rationale for deregulation, and the practical effects of the proposals.

The Rationale for Deregulation

A proposal to repeal parts of a piece of legislation which, in its new consolidation, came into force on 27 August could only be justified by radical new evidence. We are not aware of any such evidence. Three reasons are given for proposing repeals:

Firstly, that the provisions are used little or not at all. This fails to take account of the existence of legislation acting as a deterrent to operators of potentially polluting processes. Often the threat of action under the Acts is an effective remedy; agreement may also be reached prior to the completion of court proceedings. Furthermore, the statistics in the paper show that some powers are still widely used, even during a period of reduced economic activity. For those that are not, we can only question the practical benefits to industry which will accrue from their repeal.

Secondly, that the advent of EPA 1990 means that significant polluting industrial processes are subject to a more comprehensive prior control system. Whilst individual Part B plant are subject to stricter control, it remains the case that for many local authorities the sum total of potential pollution from a large number of non-prescribed processes outweighs that from a comparatively small number of EPA-regulated processes.

Thirdly, that statutory nuisance powers will provide sufficient safeguards. Much of the 1980s were taken up with a drawn-out consultation exercise and much-delayed legislative proposals which eventually led to prior approval powers for local authorities under EPA 1990. One of the major benefits, agreed by all sides, was that prior approval of polluting processes was a more efficient means of pollution control than *post hoc* nuisance action. This paper appears to be taking a conceptual step backwards from the idea that prevention is better than cure, signalling a return to inefficient “firefighting” enforcement.

There are also safeguards in statutory nuisance law which could protect defendants against legal action. Local authorities have to collect sufficient evidence to be confident that BPM and reasonable excuse defences are inappropriate, and establish the presence or likely occurrence of a statutory nuisance which materially interferes with an occupier’s lifestyle. It is quite possible to damage the environment without causing an actionable statutory nuisance.

Finally it should be noted that EPA statutory nuisance provisions are not available in Scotland. Alternative action under the *Public Health (Scotland) Act 1897* is considered cumbersome and ineffective.

The current proposals can hardly be considered a major priority for environmental action. Rather they represent the Department's required quota of activity in support of the deregulation initiative. Whilst we are in sympathy with the objective of appropriate deregulation, the resources expended in this instance are likely to be out of all proportion to any possible benefit. We acknowledge that the application of the powers under consideration is limited and their contribution to the overall package of environmental protection legislation is modest, but they represent real safeguards. We do not consider that a convincing case has been made for their repeal.

The Practical Effects of the Proposals

As noted above, a considerable amount of potentially polluting industrial plant is not prescribed for prior authorisation under EPA Part I. This is particularly true of boiler plant falling below the 20MW authorisation threshold; many local authorities have a considerable number of such plant serving hospitals, schools, local industry, etc, whilst plant in excess of 20MW are comparatively rare. Potentially polluting small scale incinerators and waste burning furnaces below EPA authorisation thresholds are also controlled by this legislation. At a recent NSCA workshop on local air quality management it was shown that such small and medium scale combustion plant can pose a significant threat to local air quality. Prior approval powers thus remain important. Furthermore, if the CAA requirements relating to grit and dust are also repealed then particulate emissions would no longer be subject to emission limits, or even the requirement to provide abatement plant.

Coupled with the proposals to repeal the chimney height provisions, the practical effect of the proposals would be uncontrolled emissions of solid and gaseous pollutants with no provisions to ensure effective dispersal. This runs counter to the spirit of the proposed EC Directive on small combustion plant. Unless and until the scope of EPA Part I is extended to include small boilers and furnaces, we believe that the CAA provides at least some measures helpful in the management of local air quality. It also gives local authorities valuable information about the existence and location of stationary pollution sources – an essential prerequisite for establishing an emissions inventory to assist local air quality management planning.

Specific Comments

Section 4: Prior Approval of Furnaces

The paper gives an inaccurate description of the provisions of Section 4. There is no legal requirement to submit plans and specifications for furnaces, only to notify the local authority. Many authorities are content to accept a Building Regulation Application as formal notice to install. The law also gives installers the opportunity to submit plans and specifications for local authority approval with the intention of gaining deemed smokeless approval. This may be a positive benefit to developers.

We can see no reason to revoke this section, but accept that the current 16kW threshold for domestic furnaces could be raised slightly, especially for gas fired appliances.

Section 5: Emissions of Grit and Dust

We agree that there is scope to simplify the law in this area. However the fact that there were 310 *known* contraventions in 1990/91 indicates the need to retain controls. Plant below 20MW do have the potential to emit significant quantities of grit and dust, particularly those burning heavy fuel oil and solid fuel. Furthermore Section 80 of the EPA 1990 deals only with particulate matter *emitted in smoke*; grit and dust emitted from a chimney but not contained in smoke would be exempt.

Sections 6-9: Arrestment Plant

These provisions should be retained for the same reasons as noted in comments on Section 5.

Section 10-13: Measurement of Grit and Dust Emissions

Whilst accepting that these powers are not widely used, we know of at least one local authority currently considering action against a small power station under this section. The authority cannot afford to undertake its own monitoring in support of a nuisance action.

Sections 14-16: Chimney Heights

The paper admits that the statistics on chimney height determination reflect a considerable amount of control. Respondents have argued strongly for the retention of this section, noting the benefits both to industry and the enforcing agencies from uniform standards across the country. Removal of Sections 14 and 15 would provide an incentive for operators of furnaces below 20MW to use lower grade and/or more polluting fuels. An operator could switch from a fuel with say 1 per cent sulphur to 4 per cent sulphur with no cost penalty leaving an undetermined and insufficient chimney height. Despite the lack of workable dispersion models, Section 16 has also proved useful in ensuring adequate dispersal of odours.

Dependence on *post hoc* nuisance action is clearly inappropriate in this case. Chimney heights must be agreed at the planning stage; operators are very unlikely to be required to increase their chimney heights on the basis of a statutory nuisance action.

We note that para 15 erroneously omits any reference to burning solid, liquid or gaseous matter after the words “pulverised fuel”.

Conclusion

Most local authorities have significantly more combustion plant operating below the EPA authorisation limits than above. The *Clean Air Acts* provisions have been shown to be cost-effective and beneficial control measures, consistent with Government objectives of precaution and the “polluter pays” principle. A return to control by nuisance action would be less efficient, less consistent and more expensive for industry and enforcement agencies alike.

We do not consider that a reasoned case has been made for repeal of these sections of the *Clean Air Act.* If some sacrifices have to be made as a gesture to deregulation, we would argue particularly for the retention of the prior approval powers in Section 4 and Sections 14-16. However we recommend that any proposals to repeal provisions of the *Clean Air Act* should be postponed until the implications of the EC Small Combustion Plants Directive are fully understood and the powers of Part I of the *Environmental Protecion Act 1990* are extended accordingly.

* * *

PAYING FOR BETTER MOTORWAYS ISSUES FOR DISCUSSION

Department of Transport, May 1993

In its discussion paper published in May, the Department of Transport raises a number of possibilities for charging people to use motorways as a means for paying for improvements. The Government also believes that a system of direct charging could help meet the challenge of dealing with the forecast increase in traffic growth and resulting congestion on the roads. NSCA's response to the document is reproduced below.

Introduction

1. Every day, individuals and organisations make choices about transport. NSCA believes that it is a basic responsibility of Government to foster a framework in which these choices result in travel patterns which represent the best compromise between social, economic and environmental interests.
2. No such framework exists. In discussions about the UK Sustainability Plan, transport policy has become a primary example of the Government's unwillingness to intervene in the long term interests of society, the economy and the environment – a "hands-off" approach which can only lead to muddle and poor allocation of resources.

Objectives Unclear

3. Without a policy framework for transport in a sustainable economy, the current proposals for motorway charging make little sense. This is reflected in a lack of clarity in the discussion paper. Para 3.8 notes the option of reducing demand by use of a price mechanism, whilst 3.15 states ". . .direct charging would help to finance more road capacity". Is the primary objective to manage demand or finance more road building? In many respects the two objectives conflict.
4. It is unclear whether money raised through direct charging is to be earmarked for road building. If it were, this would create an interesting precedent. In Germany a proportion of fuel duty (about 1p/litre) is channelled directly to investment in public transport. The discussion paper offers no evidence of alternative policy

evaluation, as recommended in official guidance on policy appraisal and the environment, to see whether (for instance) objectives might be better met by investing in improving public transport provision rather than building more roads. Again, this is because clear objectives have not been identified.

5. The discussion paper states that "...a direct charging system would ideally be based on an accurate estimate of the full costs of roads and road use" (2.7). The Society agrees with this, but traditional cost-benefit analysis can only offer a partial and inadequate assessment of the impact of transport choices and the means by which they are accommodated or managed. In the absence of clear objectives for UK transport policy we can only state with certainty that the current framework fails the test of sustainability. Positive measures to manage demand for road space are likely to be more satisfactory than simply aiming to meet the projected rise in demand, or relying on congestion arising from an inability to meet the demand which occurs at current price levels, as an instrument of demand management.

Disadvantages of Direct Charging

6. Motorway charging is a blunt instrument of demand management. It would suffer from a number of problems identified by the discussion paper. Charging would be an avoidable cost, encouraging motorists to spill onto other roads, displacing congestion and pollution. Tolls would require new land and slow the flow of traffic. Permits, once purchased, fail to manage road use and have an inequitable impact on occasional motorway users. Electronic charging would be costly, require widespread use of new technology, a new bureaucracy and new regulations; hardly reflecting the current commitment to deregulation. It may also have unwelcome implications for the protection of civil liberty. We believe on current evidence that none of the proposed options are likely to prove fair or effective.

Motoring Taxes

7. Whilst Vehicle Excise Duty (VED) and fuel duty cannot accurately reflect the cost of individual journeys (2.9), they represent an "entry level" tax and road use tax respectively. They could be adjusted to reflect the cost of individual journeys more effectively by relating VED to vehicle fuel efficiency, and by substantially increasing fuel duty so that the cost of fuel becomes a significant factor in choosing between transport modes. This would also help to manage road demand; known congested routes would be avoided because of the likely increased fuel use, and reduced average speeds on fast roads would increase capacity.

8. NSCA welcomed the recent budget increase in motor fuel duty, and the commitment to raise it in real terms in successive years. However the elasticity of demand for automotive fuel suggests that this will have a marginal impact on vehicle choice and use. We believe there is room for a substantial increase in fuel duty over and above that already proposed. VED still costs less in real terms than ten years ago; this should be banded steeply in relation to vehicle fuel efficiency standards.

9. Taxation would thus act to restrict demand and encourage investment to improve

efficiency, sending clear signals to individual consumers and organisations to include the real costs of transport in their plans. The Govenment's case against increased motoring taxes is that they ". . .would not tie the cost of travel directly to the linked costs of infrastructure or congestion imposed on other users" (9.1). Neither would the current proposals. Increased motoring taxes, however, are linked directly to road use and have the dual advantages of universal application and administrative simplicity. This would be our favoured option.

A Sustainable Transport Policy

10. Meanwhile we would urge a more informed debate about the pattern of taxation, subsidy, investment and planning which might produce a transport system more closely approaching the principles of sustainability. We would particularly stress the need for a level playing field for investment appraisal and environmental impact assessment of transport modes.
11. The broad objective is a reduction in the transport intensity of the economy; appropriate signals must be sent now to influence current choices and future plans. Raising money from motorists to pay for more motorways is unlikely to represent the best road ahead, but to determine this there is a need for wider consensus on the ultimate destination.
12. The Government has yet to put in place a framework which will identify the characteristics of a sustainable transport system and the means by which it may be aproached. Opportunities to create such a framework exist in the shape of the UK Sustainability Plan, and in official responses to the EC Fifth Action Programme and the EC Green Paper on sustainable mobility. Meanwhile it is inappropriate to consider detailed options advanced in the current discussion paper whilst a policy vacuum supplies the wider political context.

DEROGATION FOR HGV MANUFACTURERS

European Community Directive 91/542, agreed in October 1991, requires heavy goods vehicles to meet strict emission limits (see below) from 1 October 1993. However the UK is proposing to take advantage of a European Community amendment which permits Member States to register up to 10 per cent of the previous year's total vehicle sales volume for up to a year after the effective application date of the Directive without the vehicles needing to meet the new emissions limits. Thus it is proposed to amend the Goods Vehicle Type Approval Regulations so that 10 per cent or 50, which ever is the greater, of an individual manufacturer's unregistered vehicles may continue to be registered up to 30 September 1994. For those diesel vehicles which do not require type approval (ie. those produced by low volume specialist manufacturers) the Construction and Use Regulations provide a similar derogation for up to 50 vehicles per manufacturer.

NSCA, in a letter to the Department of Transport expressed its disappointment at the decision. It pointed out that HGV manufacturers had had sufficient knowledge of the emission standards which would be required well in advance. Responsible manufacturers have been phasing out non-compliant models well before the compliance deadline. Other manufacturers took a commercial gamble and planned to produce vehicles with inferior emission standards until the last possible moment. The effect of the proposal is thus to reward those sectors of the industry which have shown least commercial foresight and most contempt for the environment.

The most equitable solution would be to require dealers to pre-register non-compliant vehicles, which could then be sold at lower prices to customers. Any cost penalty would be passed back to manufacturers, penalising the least responsible. Making a special case for manufacturers sends entirely the wrong signals.

NSCA NEWS

LOCAL AUTHORITY AIR POLLUTION MONITORING
NSCA SURVEY

Introduction

The Department of Environment consultation paper on integration of local authority air pollution monitoring is due to be issued soon. Discussions on the EC Air Quality Framework Directive suggest an increase in the spatial distribution and sophistication of air pollution monitoring activities.

NSCA believes that, given adequate resources, local authorities should be playing a major role in monitoring and managing air quality. However there is very little current information about the extent of local monitoring activities.

The Society therefore felt that it would be helpful to have an up-to-date picture of local authority activities and aspirations in the field of air pollution monitoring. So far as we can determine this is the first comprehensive national survey seeking information on the full extent of local authority air quality monitoring activities. The results, shown below, were published on the final day of NSCA's 1993 conference held in Brighton in October.

Survey Results

Total number of replies:	354
Total number of UK local authorities:	486
% of local authorities taking part in the survey:	73%

1. Which best describes your air pollution monitoring effort?

a. No monitoring	29
b. Occasional monitoring	79

Regular monitoring:

c.	Simple monitoring* of one or two pollutants	176
d.	Simple monitoring of a range of pollutants	75
e.	Sophisticated monitoring† of one or two pollutants	18
f.	Sophisticated monitoring of a range of pollutants	3
g.	A mixture of simple and sophisticated techniques	56

[* e.g. diffusion tubes, bubblers] [† e.g. real-time continuous analysers]

50 authorities ticked b and c, occasionally monitoring one or two pollutants.
19 authorities ticked more than one answer for c-g.

Of the authorities responding, only 8% carried out no monitoring at all, and 22% monitor occasionally, so 70% of those surveyed carry out regular monitoring. The majority of this is simple monitoring of one or two pollutants (72%). 23% say they carry out sophisticated monitoring of some pollutants. The survey identifies 325 local authorities who undertake at least some air pollution monitoring.

Are you:

h.	Monitoring at one or two sites	37
i.	Monitoring at several sites	276

(12 authorities who carry out monitoring did not answer this question)

Is it mainly:

j.	Ambient air quality monitoring	240
k.	Source monitoring of specific industrial processes / landfill sites etc.	53
l.	Workplace monitoring for COSHH enforcement	2
m.	A mix of the above	59

Some authorities answered more than one option. 36 put both j and k as their main monitoring activities.

The majority of monitoring is for ambient air quality

2. Which air pollutants do you monitor regularly?

Black Smoke	123
Dust/grit	83
PM_{10}/particulate	45
SO_2	191
NO/NO_2	277
CO	41
Hydrocarbons/VOCs	42
Toxic organics (TOMPS)	10
Ozone	38
Lead/heavy metals	61
Benzene	27
Radiation	38
Methane	20
Smoke	3
Fluorine	2
Carbon dioxide	6
Radionuclides	1
Hydrogen fluoride	1
Chlorides	3
Mercury	1
Ammonia	4
Cyanide	1
Pollen	2
Antimony	1
Odour	2

3. Do any of the air pollutants you measure exceed WHO or EC guidelines?

never	149

occasionally	106
regularly	9
not known	61

Air quality guidelines are exceeded in 35% of authorities that monitor, but only 3% record regular exceedences.

4. Do you receive requests for monitoring data from:

The public	207
Schools and colleges	190
Local voluntary groups	90
National environmental groups	125
Industry	63
Consultants	113
Local media	125
Other departments in your own authority	106

Many authorities did not specify who the ‘others’ were, but requests come from MPs, councillors, monitoring organisations like Warren Spring Laboratory, regional pollution groups (e.g. Manchester Air Pollution Advisory Committee.)

There is a considerable demand for data from the public, media and politicians and environmental organisations.

5. How do you achieve quality assurance, data validation and instrument calibration?

No formal regime	117
Own resources	116
Consultants	115
not known	15

Some authorities use a combination of their own resources and consultants.

6. Do you consider the main impact of local air quality to come from:

	no problem		minor problem		major problem	
Part A processes	183	52%	124	35%	47	13%
Part B processes / other industry	48	14%	242	68%	64	18%
Agriculture	158	45%	179	50%	17	5%
Domestic sources	110	31%	223	63%	21	6%
Transport	60	17%	146	41%	148	42%
Other...	328	93%	19	5%	7	2%

Other sources were: transboundary pollution from power stations, aircraft and airports, industrial bonfires, nuclear industry, landfill and dust.

Part B processes and transport emissions have the greatest impact on air quality emissions according to environmental health officers. Given the smaller number of Part A processes it is surprising to see 13% of authorities considering them to be a major source of concern. Transport emissions are felt to present the most serious problem overall — almost half the authorities who perceive it as a problem think it is a serious one. Domestic sources are seen as a significant source of minor impact.

7. Which are your major sources of air pollution complaints:

	no problem		minor problem		major problem	
Part A processes	206	58%	95	27%	52	15%
Part B processes / other industry	67	19%	177	50%	109	31%
Agriculture	110	31%	166	47%	77	22%
Domestic (including bonfires)	92	26%	157	44%	164	46%
Transport	135	38%	176	50%	42	12%
Other...	320	90%	24	7%	9	3%

Other sources were: industrial bonfires/building sites, odour, sewage and wastewater treatment, building cleaning, back street garages and restaurants.

From the public perception domestic sources are the major cause of complaint, followed by Part B processes, agriculture and transport. This may be because they feel that something can actually be done about the activities of their neighbours, because these activities affect them directly and they know who to blame. More complaints are received about agricultural activities than transport, which is a relatively minor source of complaint — possibly because the public feel that there is little they can do about overall levels of traffic pollution, while they are actively contributing to it.

8. Over the last few years, did your monitoring effort:

Increase	254
Stay the same	74
Decrease	27

78% of authorities have increased their monitoring activities over the last few years, suggesting a growing interest and concern about air quality.

9. Is your future effort likely to:

Increase	181
Stay the same	155
Decrease	18

51% of authorities expect to increase their monitoring effort.

10. How do you feel about your monitoring effort.

More than adequate	3
About right	32
Would like to do more, but lack resources	269
Would like to do more, and plan to expand	49

76% would like to expand their effort but are limited by resources, while only 14% plan to expand.

11. Do you:

Own most of your own monitoring equipment	266
Lease/hire most of your monitoring equipment	30
Have most of your monitoring done by consultants	23
We also share some equipment with other local authorities	44

Several authorities said they both own and lease equipment.

12. Is your monitoring data:

Communicated to the appropriate Committee	227
Communicated to the public (e.g. local authority publications)	108
Communicated to the media (e.g. local press, radio or TV)	74
Communicated to the local authorities in your area	97
Aggregated with other local authority data in your area	93
Aggregated nationally (e.g. smoke and SO_2 network)	210
Used in the assessment of individual planning proposals	65
Used in assessment of new road/traffic management proposals	40
Used to inform decisions on local/structure/UDP plans	39
Used in local health studies	54
Used in EPA 1990 (Part B process) enforcement	77
Used in dispersion modelling studies	19

Given that the survey identifies 325 authorities who undertake at least some monitoring, the information gathered appears to be put to only limited use. Some is aggregated locally or nationally, but a surprising number of authorities fail to communicate their monitoring data to the responsible committee, let alone the public. Even fewer make use of the data for strategic planning.

13. Is your air quality monitoring carried out in partnership with others:

Local authorities	110
Local health authorities	12
Academic bodies	35
Government bodies	135
Others — include Warren Spring Laboratory, industries	21

There appears to be considerable collaboration with government bodies and other local authorities.

14. Do you issue health advice to the public on the basis of your monitoring (e.g. smog alerts)?

No	336
Yes: based on DOE good/poor air quality thresholds	10
Yes: based on your interpretation of WHO AQ guidelines	6
Yes: based on other criteria	2
We also issue advice about reducing pollution during episodes	11

5% of authorities who monitor air pollution issue health advice and 3% issue advice about reducing pollution. This compares with 35% recording exceedences of air quality guidelines.

15. Do you compile information on the sources and magnitude of local pollution emissions (i.e. a local emissions inventroy)?

No	326
Yes	28

8% of authorities who monitor compile information on local sources of air pollution.

16. Would you support a statutory obligation for local authorities to monitor where there is a possibility of air quality guideline breaches, assuming that sufficient resources were made available?

No (personal view)	5
No (your authority's official view)	2
Yes (personal view)	331
Yes (your authority's official view)	112
personal view not given	18
local authority view not given	114

Of responding EHOs whose views are known, an overwhelming 99% support a statutory obligation for local authorities to monitor where there is a possible breach of air quality guidelines. Of local authorities whose views are known, 98% support a statutory obligation.

Conclusions

The survey reveals a very mixed picture across the UK. However nearly a quarter of all authorities who monitor already consider themselves to be using sophisticated techniques to monitor at least some air pollutants.

Some authorities may need to give further thought to why exactly they are undertaking monitoring. One in five do not know if the pollutants they measure exceed published health guidelines. Much of the data does not appear to be communicated to a wide audience.

Few authorities have taken steps towards using their monitoring for local air quality management, identifying and quantifying local pollution sources and using strategic planning to reduce pollution. However an encouraging number are collaborating with neighbouring authorities, and the basis for regional airshed management may already be present in nascent form.

Local authorities have increased their monitoring effort over the last few years and half of them expect to increase further. Most would like to but lack the resources to do so. This might be assisted by a statutory requirment to monitor where there is a possibility of AQ guideline breaches. With the usual caveat of adequate resourcing, this receives the overwhelming support of EHOs and local authorities.

Local Authorities Responding to the Survey

ABERCONWY BC
ABERDEEN DC
ADUR DC
ALNWICK DC
ALYN & DEESIDE DC
AMBER VALLEY BC
ARFON BC
ARGYLL & BUTE DC
ARUN DC
ASHFIELD DC
ASHFORD BC
AYLESBURY VALE DC
BABERGH DC
BANFF & BUCHAN DC
BARKING & DAGENHAM LB
BARNET LB
BARNSLEY MBC
BASILDON DC
BASINGSTOKE & DEANE
BASSETLAW DC
BATH CC
BEDFORD CC
BEVERLEY BC
BEXLEY LB
BLABY DC
BLACKBURN BC
BLACKPOOL BC
BLAENAU GWENT BC
BLYTH VALLEY DC
BOLSOVER DC
BOLTON MBC
BOOTHFERRY BC
BOSTON BC
BRACKNELL FOREST BC
BRADFORD MBC
BRAINTREE DC
BRECKLAND DC
BRECKNOCK BC
BRENTWOOD BC
BRIDGNORTH DC
BRISTOL CC
BROADLAND DC
BROMSGROVE DC
BOXBOURNE DC
BROXTOWE BC
BURNLEY BC
BURY MBC
CALDERDALE MBC
CAMBRIDGE CC
CAMDEN LB
CANNOCK CHASE DC
CANTERBURY CC
CARDIFF CC
CARRICK DC
CARLISLE CC
CARMARTHEN
CARRICKFERGUS BC
CASTLE MORPETH BC
CASTLE POINT BC
CASTLEBREAGH BC
CHARNWOOD BC
CHELMSFORD BC
CHESTER CC
CHESTERFIELD BC
CHESTER-LE-STREET DC
CHICHESTER DC
CHILTERN DC
CHORLEY BC
CHRISTCHURCH BC
CLACKMANNAN DC
CLEETHORPES BC
CLYDESDALE DC
COLCHESTER BC
COPELAND BC
COTSWOLD DC
COVENTRY CC
CRAWLEY BC
CREWE & NANTWICH DC
CROYDON LB
CUMBERNAULD & KILSYTH
CUMMNOCK & DOON VALLEY
CUNNINGHAME DC
CYNON VALLEY BC
DACORUM BC
DARLINGTON BC
DARTFORD BC
DAVENTRY DC
DERBY CC
DERRY CC
DERWENTSIDE DC
DINEFUR BC
DONCASTER MBC
DOVER DC
DOWN DC
DUDLEY MBC
DUMARTON DC
DUNFERMLINE DC
DURHAM CC
EASTBOURNE BC
EAST CAMBS DC
EAST DEVON DC
EAST DORSET DC
EAST HANTS DC
EAST HERTFORDSHIRE DC
EAST KILBRIDE DC
EASTLEIGH BC
EAST LINDSEY DC
EAST LOTHIAN DC
EAST NORTHANTS DC
EAST STAFFORDSHIRE BC
EASTWOOD DC
EDINBURGH CC
ELLESMERE PORT BC
ELMBRIDGE DC
ENFIELD LB
EPPING FOREST DC
EREWASH BC
ETTRICK & LAUDERDALE
EXETER CC
FALKIRK DC
FAREHAM BC
FERMANAGH DC
FOREST HEATH DC
FOREST OF DEAN DC
GATESHEAD MBC
GLANDFORD BC
GLASGOW CC
GLYNDWR DC
GOSPORT BC
GRAVESHAM BC
GREAT GRIMSBY BC
GREAT YARMOUTH BC
GUILDFORD BC
HACKNEY LB
HALTON BC
HAMBLETON DC
HAMILTON DC
HARBOROUGH DC
HARLOW DC
HARROW LB
HARROGATE BC
HART DC
HARTLEPOOL BC
HASTINGS BC
HEREFORD CC
HIGH PEAK DC
HILLINGDON LB
HORSHAM DC
HULL DC
HUNTINGDONSHIRE DC
HYNDBURN BC
INVERCLYDE BC
INVERNESS DC
IPSWICH BC
ISLINGTON LB
KENNET DC
KETTERING BC
KINCARDINE & DEESIDE
KINGS LYNNE BC

KINGSWOOD BC
KIRKCALDY DC
KNOWSLEY MBC
KYLE & CARRICK DC
LAMBETH LB
LANGBAURGH-ON-TEES BC
LEEDS CC
LEICESTER CC
LEOMINSTER DC
LEWES DC
LICHFIELD DC
LINCOLN CC
LISBURN BC
LONDON CORP OF
LUTON BC
MACCLESFIELD BC
MAGHERAFELT DC
MAIDSTONE BC
MALVERN HILLS DC
MANSFIELD DC
MEIRIONNYDD DC
MERTHYR TYDFIL BC
MERTON LB
MID BEDS DC
MID DEVON DC
MIDDLESBROUGH BC
MID LOTHIAN DC
MID SUFFOLK DC
MID SUSSEX DC
MILTON KEYNES BC
MOLE VALLEY DC
MONKLANDS DC
MONMOUTH BC
MONTGOMERY DC
MORAY DC
MOTHERWELLL DC
MOYLE DC
NAIRN DC
NEWARK & SHERWOOD DC
NEWBURY DC
NEWCASTLE-UNDER-LYME
NEW FOREST DC
NEWHAM LB
NEWPORT BC
NEWRY & MOURNE DC
NITHSDALE DC
NORTH CORNWALL DC
NORTH DERBYSHIRE DC
NORTH DEVON DC
NORTH DORSET DC
NORTH DOWN BC
NORTH HERTFORDSHIRE
NORTH KESTEVEN DC
NORTH NORFOLK DC
NORTH TYNESIDE DC
NORTH WILTSHIRE DC

NORWICH CC
NUNEATON & BEDWORTH
OGWR BC
OLDHAM MBC
ORKNEY ISLANDS C
OSWESTRY BC
OXFORD CC
PERTH & KINROSS DC
POOLE BC
PORT TALBOT BC
PORTSMOUTH CC
PRESELI PEMBROKESHIRE
PURBECK DC
RADNORSHIRE DC
REDBRIDGE LB
REDDITCH BC
REIGATE & BANSTEAD BC
RENFREW DC
RESTORMEL DC
RHUDDLAN BC
RHYMNEY VALLEY DC
RICHMOND—UPON—THAMES
RICHMONDSHIRE DC
ROCHDALE MBC
ROCHESTER-UPON-MEDWAY
ROCHFORD DC
ROSS & CROMARTY DC
ROSSENDALE BC
ROTHER DC
ROXBURGH DC
RUGBY BC
RUNNYMEDE BC
RUSHMOOR BC
RYEDALE DC
SALFORD BC
SANDWELL MBC
SCARBOROUGH BC
SEDGEFIELD DC
SEFTON MBC
SELBY DC
SEVENOAKS DC
SHEFFIELD CC
SHEPWAY DC
SHETLAND ISLANDS C
SHREWSBURY & ATCHAM
SLOUGH BC
SOLIHULL MBC
SOUTHAMPTON CC
SOUTH BEDFORDSHIRE DC
SOUTH BUCKINGHAMSHIRE
SOUTH CAMBRIDGESHIRE
SOUTH DERBYSHIRE DC
SOUTH HAMS DC
SOUTH HEREFORDSHIRE
SOUTH HOLLAND DC
SOUTH KESTEVEN DC

SOUTH NORFOLK CC
SOUTH PEMBROKESHIRE
SOUTH SHROPSHIRE DC
SOUTH SOMERSET DC
SOUTH STAFFORDSHIRE
SOUTH TYNESIDE MBC
SOTHWARK LB
SOUTH WIGHT BC
SPELTHORNE BC
ST EDMONDSBURY BC
STAFFORDSHIRE
MOORLANDS DC
STIRLING DC
STOCKPORT MBC
STOKE-ON-TRENT CC
STRATFORD-ON-AVON DC
STRATHKELVIN DC
STROUD DC
SUNDERLAND CC
SURREY BC
SUTHERLAND DC
SUTTON LB
SWALE BC
TAFF ELY BC
TAMESIDE MBC
TANDRIDGE DC
TAUTNON DEANE BC
TEESDAL DC
TEIGNBRIDGE DC
TENDRING DC
TEST VALLEY BC
TEWKESBURY BC
THAMESDWON BC
THANET DC
THURROCK BC
TONBRIDGE & MALLING
TORBAY BC
TORFAEN BC
TORRIDGE DC
TRAFFORD MBC
TUNBRIDGE WELLS BC
TYNEDALE DC
UTTLESFORD DC
VALE OF WHITE HORSE
WAKEFIELD MBC
WALSALL MBC
WALTHAM FOREST LB
WANSBECK DC
WANSDYKE DC
WANDSWORTH LB
WARRINGTON BC
WARWICK DC
WATFORD CC
WAVENEY DC
WAVERLEY BC
WEALDEN DC

WELLINGBOROUGH BC
WELWYN HATFIELD C
WEST DEVON BC
WEST DORSET BC
WESTERN ISLES C
WEST LANCASHIRE DC
WEST LOTHIAN DC
WESTMINSTER CC
WEST OXFORDSHIRE DC
WEST SOMERSET DC
WEST WILTSHIRE DC
WEYMOUTH & PORTLAND BC
WINCHESTER CC
WINDSOR & MAIDENHEAD
WIRRAL MBC
WOKING BC
WOKINGHAM DC
WOODSPRING DC
WORCHESTER CC
WORTHING BC
WREKIN CC
WREXHAM MAELOR BC
WYCOMBE DC
WYRE BC
WYRE FOREST DC
YNYS MON BC
YORK CC

SOUTH EAST DIVISION

The Division's AGM in June saw the re-election of Paul Cooney as Chairman, F. John Smith as Deputy Chairman, Joe Beagle as Hon Secretary and B. Nagle as Hon Auditor.

The AGM was followed by a talk by Mr. A.J. Wilkins, Engineering Services Manager of Johnson Matthey Catalytic Systems Division who outlined the use of catalytic converters in reducing pollutant emissions from internal combustion engines. He compared the problems of reducing emissions from petrol and diesel engines, explaining how the latter needed a non-sulphate producing converter. In conclusion he spoke of the partnership between Johnson Matthey and its customers in meeting technical standards to enable compliance with EC legislation.

NSCA South East Division
in association with the
South East Institute of Public Health

POLLUTION PARTNERSHIP
Environmental Health, Planning & Public Health

Friday 26 November 1993
ESCC - Pelham House - Lewes
East Sussex

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South East Institute of Public Health
Broomhill House - Broomhill Road - Tunbridge Wells
Tel: 0892 515153Fax: 0892 516344

REPORTS

HMIP SEMINAR ON ENVIRONMENTAL AND ECONOMIC ASSESSMENTS FOR IPC

Report by
Ken Gregory, Hoskyns Consulting
Chairman, NSCA Technical Committee

The seminar on 16 July was arranged by HMIP to present their thinking on the implementation of Best Practicable Environmental Option (BPEO). The meeting was attended by around 50 consultees from industry, trade organisations and environmental organisations. Ken Gregory attended for the NSCA. The seminar was charied by Dr Douglas Bryce (HMIP) who noted that this was one of a sequence of seminars and anticipated issuing a consultation document on the subject of environment and economics. He emphasised the concept of environmental protection at reasonable cost.

HMIP Introduction

The seminar was introduced by Dr David Slater, Chief Inspector, who stated that the aim was to put forward thoughts and to get feedback (which will be welcomed in writing). He noted that the *Environmental Protection Act* had brought in concepts such as BPEO and HMIP were now trying to put flesh onto the ideas. He wanted to expose the thinking to underpin judgements that had been taken, to put logical justification to them and for HMIP to become more predictable. He suggested that HMIP would produce new Guidance Notes based on this thinking but put the question to the audience – if not this – what?

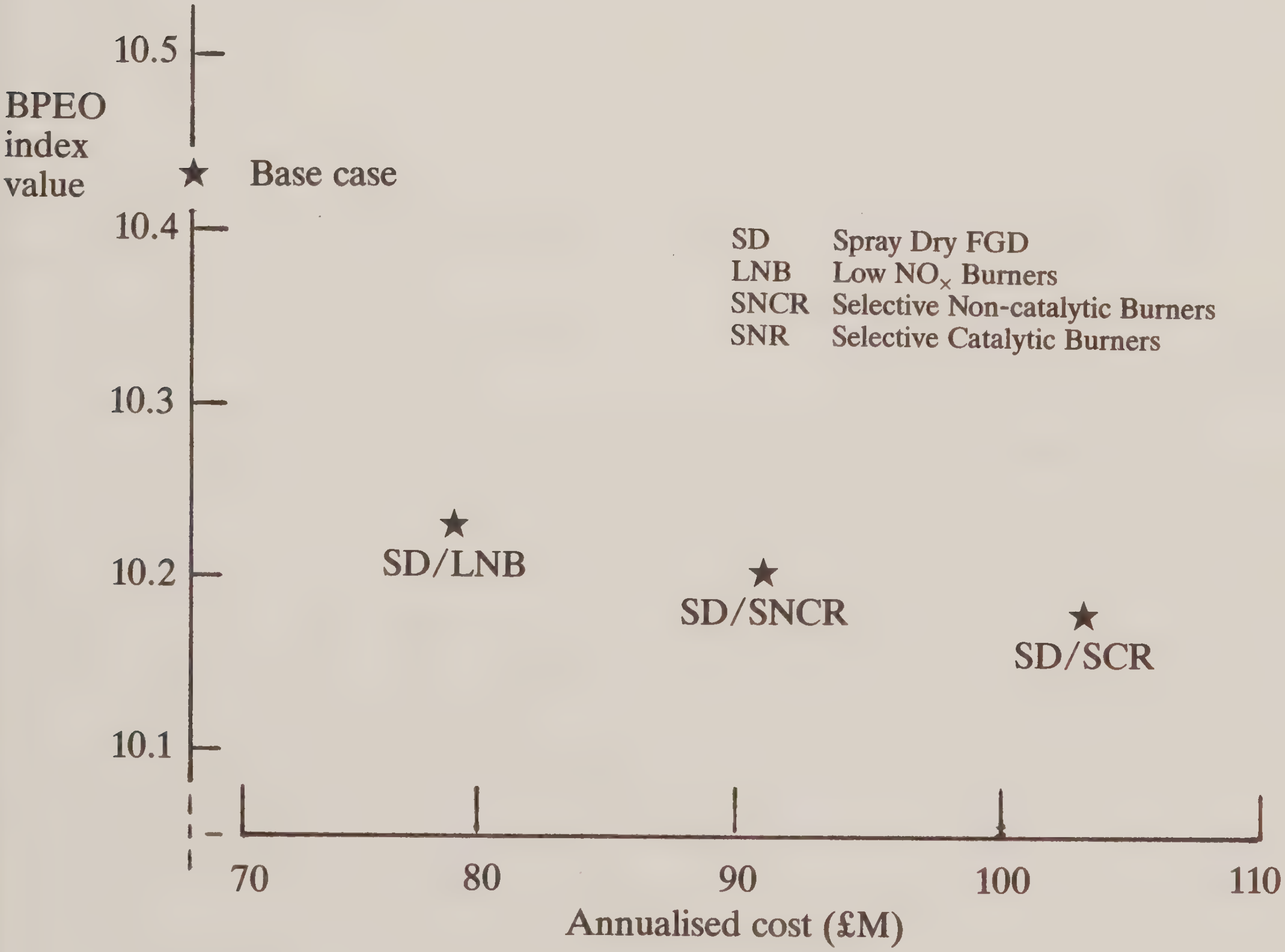
In summarising HMIP's thinking, Stefan Carlyle emphasised the words "practical, effective and pragmatic". He stated that the concept of BPEO was that unacceptable levels of pollution would be proscribed and that Best Available Technique Not Entailing Excessive Costs (BATNEEC) would be used to do better than this. He discussed the concept of producing Tolerability Quotients (TQ) for each release of a pollutant to each medium (air, water and land). These could then be summed to produce a total TQ for a process (the BPEO index). Different processes would produce different total BPEO indices and these could then be compared. It was noted that TQs would include background levels of pollution as well as an individual plant's contribution.

Dr Peter Douben discussed the concept of a Regulatory Assessment Level (RAL) which would be a measure of the maximum level of pollution an environment could stand. (Local concentrations not emissions). Where an Environmental Quality Standard (EQS) (e.g. an Air Quality Standard) had been defined then the RAL would equal the EQS. Otherwise alternative approaches would be adopted. Emissions from a source should not lead to concentrations above a RAL (otherwise they would not be allowed). The TQ would depend on the RAL set, on the contribution of a plant to concentrations of the pollutant and on ambient concentrations. Interim RALs are expected to be published soon.

Tom Gameson gave HMIP's preliminary thinking on economics. If a process led to the lowest BPEO index then this would be accepted. If an operator wanted to adopt an option with a higher BPEO index, presumably at a lower cost to himself, then it was up to him to put an economic argument to justify the poorer environmental option.

Dr Colin Powlesland presented a hypothetical case study based on a coal fired power station; Figure 1 gives an example of a cost comparison. The BPEO index is plotted against the annualised cost of pollution abatement. The implication is that the lowest BPEO would not necessarily be chosen because of the high marginal cost.

Figure 1 Comparison of annualised cost and BPEO index for base case and abatement options.



Discussion

In discussions, the approach of HMIP was generally welcomed and questioners concentrated on practical difficulties.

There were comments about including the background into the BPEO index for a plant. HMIP emphasised that it was the comparison of different processes for a plant that was important but agreed to look at this. (In the example in their paper the BPEO index goes down from 10.42 in the base case to 10.19 when full abatement equipment is used. The high figures are caused by the background pollution levels in the local river). There was also concern about giving equal weight to all pollutants emitted to all media. HMIP pointed out that they hoped that the correct choice of each RAL would be the means by which the pollutants and media would be weighted.

Several speakers noted that as HMIP is not responsible for solid waste they had not included it in their index. They essentially assume that items such as limestone quarrying and solid waste disposal meet regulations set by other bodies. This is clearly a major weakness, which was adopted by HMIP after legal advice. Fresh legislation would be required to allow these factors to be incorporated.

Other points raised included:

- The values set for RALs are critical, HMIP should think about a risk assessment approach in setting RALs;
- BATNEEC is cost benefit anyway;
- what is the value of one point on the BPEO index?
- industry would have problems in producing confidential total cost data for new processes (hence go for incremental cost data);
- it seemed wrong to write off one option (as in the HMIP example) because the river was already filthy;
- environmental damage should be costed out and such costs used in decision making. It was noted that the National Rivers Authority were starting to do this, though generally speaking little good information is yet available on environmental damage costs;
- where there were several proposals in one area — the BPEO index appears worse for successive applicants. In response HMIP noted the problem of the East Thames Corridor and NO_x emissions. They commented that other factors may be considered if ambient levels of a pollutant are close to its EQS.

In summary, it was felt that HMIP had produced an interesting approach to Integrated Pollution Control and to calculating the Best Practicable Environmental Option. Much work needs to be done on the practicality of the BPEO index and on the economic side.

NSCA's PRELIMINARY VIEWS

Following the seminar, the NSCA Secretary General wrote to the Chairman of the seminar outlining NSCA's preliminary views on HMIP's thinking. In welcoming the objective of a more consistent approach to IPC assessment, and the use of quantitative methods of hazard identification and risk assessment where these are appropriate, NSCA has some concerns about the approach now advocated by HMIP.

A BPEO index is a useful concept, but depends critically on the weighting given to the various environmental impacts, and on the validity and intercomparability of chosen Regulatory Assessment Levels. The ultimate Index will be very sensitive to the quality and representativeness of the original data. Under these circumstances a single Index figure could imply an unwarranted degree of precision.

The method of deriving the BPEO index relates only to those aspects of process function over which HMIP has regulatory responsibility, namely outputs of regulated pollutants. The exclusion of solid waste output was identified as an important omission at the seminar; so too is the consideration of process inputs. If waste minimisation and industrial pollution control measures are to be viewed in appropriate perspective, inputs of raw materials, process chemicals and energy should all feature in any assessment of the BPEO.

Consideration of competing FGD processes offers a useful model here. Taking into account the impacts of limestone quarrying, transport and gypsum disposal might tip the balance between different process options and, equally importantly, might produce different solutions in different parts of the country even if the calculated tolerability quotients were comparable. On a lifecycle assessment the current proposals would not necessarily produce the best deal for the environment, or for the economy.

That said, the systematic approach needed to derive the BPEO Index should provide a very significant aid to expert judgement and improve consistency of treatment from case to case. The approach will also reinforce expert judgement where there are large differences between options.

It follows that NSCA favours evolution not revolution, with quantitative methods making a progressively greater contribution to regulatory judgement as experience is gained and quality data accumulated. As the signal to noise ratio increases, confidence will build in the use of complex factors such as the BPEO Index in choosing between more closely ranked options. It is unlikely that it will ever be possible to base BPEO decisions solely on simple numerical indices — attractive though the concept may appear. However quantitative methods should find an important place within a broader framework which assures harmonisation of approach but allows inspectors to make judgements based on technical expertise and local knowledge. We hope therefore that the consultation paper will consider the place which this assessment procedure will be given in the decisionmaking hierarchy.

NSCA welomes the current proposals as a useful and provocative focus for discussion. We hope that practical experiments will be supported so that we can move quickly from theory to the real world. There is no doubt that transparent and consistent methods of implementing more precisely the sophisticated concepts of BATNEEC and BPEO could do much to improve the extent to which environmental protection regimes can be matched to circumstances with consequent benefits to the environment, the economy and society.

NSCA will be responding in more detail to the forthcoming consultation paper.

◆

ASSESSING THE IMPACT OF AIR POLLUTION ON THE NATURAL ENVIRONMENT

Dr Andrew Farmer
English Nature

Introduction

Early in 1993 English Nature published a leaflet entitled *Air Pollution and Environmental Assessments: Necessary Components for Assessing the Impact on Nature Conservation*.* This article outlines some of the background to this publication and lists the key points for environmental assessment contained therein.

A wide variety of air pollutants are known to affect plants and animals in natural ecosystems. Usually impacts are due to the direct toxic effects of the pollutant on an organism. However, pollutants can also cause indirect changes to the ecosystem which may result in loss of species. This is particularly so for excess deposition of acidity or nitrogen.

Air Quality Criteria

The main pollutants likely to be emitted to air in sufficient quantities to affect nature conservation are the acid gases, fluoride, particulates and ethylene. While emissions of heavy metals, dioxins and many other toxic substances could have serious impacts on the natural environment, these ought not to do so if controlled to protect human health. Most regulatory officials and environmental consultants work to the air quality guide values from EC Directives and those produced by the World Health Organisation. However, these are often insufficient to protect sensitive species. Thus the EC guide value for sulphur dioxide is 40-60 $\mu g/m^3$, but a recent UNECE workshop suggested that a critical level for effects on vegetation should be 10-22 $\mu g/m^3$. The concern for English Nature is the control of pollutants for which humans are not the most sensitive organism as control values on concentrations may not be strict enough. This has important implications for the values that may be set by HMIP to determine environmental impacts under its BPEO assessment.

Information for Environmental Statements

For a complete assessment of the potential impact of a process on the environment it is necessary to consider fully effects of ground level concentrations of pollutants and what the implications of these might be. This would require the following different analyses. Presentation of this information should encourage a more uniform approach to assessing environmental impacts of air pollution.

1. Pollution emission data. Presentation of three aspects of a pollutant emission may be necessary. Firstly the concentration (mg/m^3) and emission rate (g/s) in flue gases should be given. This is all that is necessary for small processes. However, if these rates are high, modelling of ground level concentrations (μg/m^3) will be necessary (see 2). Finally, if total pollution emissions are large a measure of total mass emitted (t/y) is necessary to assess the contribution of the process to regional pollutant deposition.

2. Modelling of emissions to estimate effects on ground level air concentrations should be done under a range of weather conditions. Plants respond to short-term peaks and long-term doses of pollutants, so it is necessary to know annual means and 24 hour maximum concentrations. If operation of the process is unlikely to be uniform throughout the year, it is necessary to know the effect on ground level concentration during those periods of operation.

3. The historical and possible future trends in ground level air concentrations should be determined. Natural communities will have been affected by the past pollution history of an area. Thus a small increase in pollutant concentration may have no impact in an area which has shown a significant recent decline in background levels, but in a different location it could cause a critical level to be exceeded if background levels have been rising. Assessing future trends will be necessary for processes in areas where other major new developments are under construction or consideration.

4. For pollutants emitted in significant quantities it may be necessary to estimate deposition rates and compare these with background deposition. This is particularly so for nitrogen oxides and ammonia, which may be of low enough concentration not to cause direct toxic effects through the gases entering leaves, but could cause a significant increase in the nitrogen status of a sensitive community.

5. The presence of other pollutants must be considered. Natural systems respond to multiple pollutant stresses and even if a process is only emitting one significant air pollutant it is only possible to assess its impact if background levels of other pollutants are known. Thus sulphur dioxide, nitrogen dioxide and ozone may all have direct synergistic toxic effects. Sulphur dioxide and ammonia will also deposit at a higher rate if both gases are present together.

6. It is important to describe the natural systems in the vicinity of the process. This should include an indication of any biological Sites of Special Scientific Interest and whether these contain species or communities recognised as particularly pollution sensitive. If there are any past indications of pollution damage, these should be given. Details concerning individual SSSIs are available from the local offices of the conservation agencies.

7. For processes that emit very large amounts of pollutants it is necessary to assess regional or even national impacts on the contribution to total acid deposition. This should be compared with maps of acid sensitive areas and critical loads maps produced by the Department of the Environment. If the process causes a significant increase in

deposition to a region or an increase in degree of exceedence of critical loads then this should be discussed with the conservation agencies.

8. If there is a possibility that some impact may occur on biological systems, the effects of alternatives to the propossed process should be given. This may be as simple as to indicate the effect of increased chimney height, the effects of different fuel options or options for removal of pollutants from flue gases.

9. Finally, after such analyses, applications for processes that may present a potential problem should indicate ways that environmental monitoring (both pollutant and biological) will be undertaken to assess whether impacts do occur. Such a programme should be devised after detailed discussion with the conservation agencies.

*This leaflet was published in 1993 by English Nature. A catalogue listing current titles is available from Dept EN19, English Nature, Northminster House, Peterborough PE1 1UA.

1994 NSCA POLLUTION HANDBOOK

Available February 1994

The NSCA Pollution Handbook is the standard reference book for environment protection specialists, providing a comprehensive one-stop guide to all UK and European Community pollution control legislation.

Widely used by government departments, HMIP, local authorities, industry and environmental consultants, the NSCA Pollution Handbook maintains a reputation as the most up to date and best value for money publication of its kind.

The 1994 edition has been fully revised to take account of all legislation in force at the beginning of 1994, and includes details of the new Clean Air Act 1993 and Radioactive Substances Act 1993, alongside the usual chapters covering air pollution, waste, noise and water. Appendices list prescribed processes and substances under the Environmental Protection Act, smoke control orders, EC Directives, and water quality objectives. The Handbook is a set reference book for several university environmental courses.

1994 NSCA POLLUTION HANDBOOK
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Card account will not be debited until despatch of the Handbook.

TOBACCO ADVERTISING

Action on Smoking and Health

For the past two years health and other groups in the United Kingdom have been campaigning to persuade the Government to support a European Community Directive to ban all tobacco advertising. And indeed governments across Europe have been working towards a Europe-wide ban. Tobacco advertising is already banned in France, Italy and Portugal. They join countries across the world such as Canada, New Zealand and Sweden which have acted to protect the health of their children against sophisticated campaigns to promote smoking.

On 5 November the European Council of Health Ministers meet to discuss the Directive and it seems likely that this will be the last chance to obtain support for a Europe wide ban. Up to now the UK, with the help of Germany, has been blocking a ban as it does not believe that this would reduce smoking. Because of the voting arrangements the UK's position is critical. If the UK Government changes its mind, an end to tobacco advertising would be the result.

ASH is urging all those who support a ban on tobacco advertising to write to their MP saying why they are concerned and asking them to support a ban. It says that in the absence of a Europe wide ban an alternative would be a UK Act, possibly through Private Members legislation which could be initiated in November.

The arguments against tobacco advertising are clear. Tobacco kills over 300 people every day in the UK. Just to stay in business the tobacco industry needs to recruit at least this number of new smokers every day. Most of these new recruits are children. On present trends, of the 100 million children alive in the European Community today, more than 10 million will be killed before their time by tobacco.

Tobacco advertising was banned on TV in 1965 but, illogically, it is still legal everywhere else. Children see tobacco advertising on the streets where they play, in the shops where they buy their sweets, in the sport they watch on TV. Every year the tobacco industry spends over £100 million advertising tobacco. They claim it does not attract children to smoking. Study after study shows they are wrong. Children who are most aware of advertisements are most likely to become smokers. In Norway, where advertising was banned in 1975 smoking amongst 13 to 15 year olds fell from 17% before the ban to 10% in 1990.

The very first target date in the recently announced Government health strategy, the 'Health of the Nation,' is for reductions in teenage smoking. The goal is to reduce regular smoking amongst children aged 11 to 15 to 6% or less by 1994. The Government's Chief Medical Officer has acknowledged that this target will not be met. In fact, the target will be missed by miles. A refusal to ban tobacco advertising looks very odd in this context.

A Government study, the Smee Report, looking at advertising bans worldwide, found that bans were followed by falls in smoking rates of between 4% and 9%. If the

UK achieved even the lowest figure, it would save more than 10 lives each and every day. Following the report, the all Party House of Commons Health Select Committee recommended a complete ban. So far the Government has not taken any action.

For more detailed information on tobacco advertising and on other tobacco control issues, please contact: ASH, 109 Gloucester Place, London W1H 3PH. Tel: 071-935 3519 Fax: 071-935 3463.

TOBACCO FACTS

ENVIRONMENT

- Every year the curing of tobacco in wood-fired "barns" consumes trees from 5 to 11 million acres of land. *(World Tobacco, May 1987).*
- Tobacco uses vast amounts of fertiliser, herbicide and pesticide – up to 16 applications may be made during a 3-month growing period. These chemicals leach into the soil and find their way into streams, rivers and food chains. *(Tobacco: a ruinous crop, John Madeley, The Ecologist, Vol 16 1986).*
- Tobacco smoke contains a number of toxic chemicals including: arsenic; benzene and carbon monoxide. *(Fourth Report of the Independent Scientific Committee on Smoking and Health. HMSO 1988).*

DEVELOPING COUNTRIES

- Tobacco is the most widely grown non-food crop in 120 countries. Less developed countries now contain 72% of the total land area under tobacco cultivation. *(New England Journal of Medicine, Vol 324 pp 917, Barry M., 1991).*
- It has been estimated that 10 to 20 million people could be fed by crops grown instead of tobacco. *(New England Journal of Medicine, Vol 324 pp 917-920, Barry M., 1991).*

BUSINESS

- It is estimated that smoking-induced illness accounts for at least 50 million lost working days a year. *(Health or Smoking, Royal College of Physicians, 1983).*
- In 1991, 3,400 accidental fires in non-residential buildings were started by smokers' materials. In all, 40% of all deaths from fire are due to fires started by smokers materials. *(Home Office Fire Statistics, 1991).*

WOMEN

- Teenage girls are more likely to be smokers than boys of the same age. In England in 1990 11% of 11 to 15 year old girls were regular smokers as opposed to 9% of boys of the same age. *(Smoking among secondary school children in 1990, OPCS, 1991).*
- In some parts of the UK, lung cancer has overtaken breast cancer as the leading cancer killer of women. *(Death by cause, OPCS, 1992).*
- Women who smoke and use the contraceptive pill have ten times the risk of heart disease and stroke. *(Royal College of General Practitioners, 1983).*
- Babies born to mothers who smoke are of lower birth weight (about half a pound) with the associated risk of death and disease in early childhood. Perinatal mortality is increased by more than one third in babies of smokers. *(Smoking and the Young, Royal College of Physicians, 1992).*

UPDATE

NATIONAL ENVIRONMENTAL TECHNOLOGY CENTRE

Dr John Rae has been appointed Director of the National Environmental Technology Centre (NETC), which was formally created by the President of the Board of Trade in June. Dr Rae is business director at AEA and a former Chief Scientist to the Department of Energy.

The NETC, which will be based at Culham, Oxfordshire, will combine the environmental resources of AEA Technology and the Warren Spring Laboratory. It will comprise a core team of leading environmental scientists and engineering experts who will have access to wider environmental and safety activities across AEA's businesses. Together they will provide a fully-integrated service incorporating applied research and development, technical services and specialist consultancy. The capabilities will include:

- Monitoring and modelling air quality and pollutants
- Site assessment, decontamination and waste management consultancy
- Marine spill monitoring and prediction
- Water pollution monitoring and modelling
- Recycling technologies
- Development of plant technology to improve environmental performance
- Environmental management and information systems

The NETC will encompass established environmental services such as the National Chemical Emergency Centre and the marine pollution monitoring and advisory team currently based at the Warren Spring Laboratory.

BRISTOL CITY AIR QUALITY

Bristol City Council has just published its Annual Air Quality Review for the year April 1992 to March 1993. This report gives a comprehensive account of systematic air pollution monitoring in the Bristol area and includes sections describing the influence of meteorological factors and road traffic on air pollution. One particularly significant fact to emerge in this monitoring year was that the EC Directive Limit Value for nitrogen dioxide was exceeded at Old Market, a kerbside site in Central Bristol. This was particularly unusual as the annual mean and median values both fell from those recorded in 1991/92. The exceedance was due to a series of pollution episodes in the last quarter of 1992.

The report was formally adopted by the City Council's Health and Environmental Services Committee in September when it was also agreed that in the light of the evidence presented in this and earlier reports that there would be change in the direction of operation of the monitoring network. As concentrations of smoke, sulphur dioxide and heavy metals have fallen considerably over the years and have now reached equilibrium values it was reasonable to reduce the effort expended in this direction and to extend the monitoring of pollution across the whole City.

To this end 34 new sites are to be established, one in each electoral ward of the City, with the aim of providing information on the air quality where people live and where children go to school. The information from these new sites combined with data from the Council's mobile monitoring laboratory should produce valuable information for this study and will also contribute to the production of a State of the Environment Report. The City Council is cooperating with bodies including the Bristol & Weston Health Authority and the Institute of Child Health at the University of Bristol to study the relationships between air quality and respiratory ill health.

Air Quality in Bristol, £10 (incl p&p) is available from the Directorate of Health and Environmental Services, Bristol City Council, Brunel House, St. George's Road, Bristol BS1 5UY.

IEHO BECOMES A WHO COLLABORATING CENTRE

The Institution of Environmental Health Officers (IEHO) has been designated as a collaborating Centre for Environmental Health Management in Europe.

The agreement by WHO to award collaborating status to the IEHO recognises its increasing role in the assistance and development of programmes for the WHO Euro Region, especially in central and eastern Europe.

The outcome of this work will be presented at the second Ministerial Conference on Environment and Health which is scheduled to be held in Helsinki in June 1994. It is likely that, as the collaborating centre for environmental health management. the IEHO will be called upon to assist in the development and implementation of individual country projects.

EPA PART I, TECHNICAL GUIDANCE NOTES

HMIP has recently published the first two technical guidance (TG) notes for those involved in implementing environmental legislation. TG notes will, however, also be of interest to process operators as guidance on the technical information being used by the regulators.

TG note M1 (Monitoring) covers *Sampling Facility Requirements for the Monitoring of Particulates in Gaseous Releases to Atmosphere.* TG note D1 (Dispersion) deals with *Guidelines on Discharge Stack Heights for Polluting Emissions* and complements the *Third Memorandum on Chimney Heights.* Forthcoming TG notes will cover monitoring emissions of pollutants at source, flaring, solvent vapour emissions and pollution abatement technology. TG Notes are available from HMSO.

CLAY TARGET SHOOTING

In the continued absence of the Department of Environment's code (see *Clean Air*, Summer 1992), the IEHO has now published for consultation a draft Professional Practice Note. This is based on the Midland Joint Advisory Council for Environmental Protection's (MJAC) code previously endorsed by NSCA .

The IEHO's PPN provides practical guidance on the ways in which noise may be controlled in order to minimise or prevent intrusion, and gives a recommended method for noise measurement and subsequent rating.

SPEED LIMITERS

An amendment to the 1986 *Construction and Use Regulations* will require all buses and coaches and HGVs first used on or after 1 January 1988 to be fitted with a speed limiter from 1 January 1996 (1 January 1995 if used for international operations). Buses and coaches with a maximum gross weight exceeding 7.5 tonnes and capable of travelling at more than 65 mph will need to be fitted with a device limiting their speed to 65 mph. HGVs over 12 tonnes and capable of more than 56 mph must be fitted with a device limiting their speed to 56 mph.

CAR SHARE AGENCY

The Travelshare Company has been set up with support from Newcastle City Council and the Prince's Youth Business Trust and through a membership scheme matches drivers and passengers. The organisers see the scheme as not only saving money for both passengers and drivers but as a contribution to reducing traffic congestion and pollution.

Members pay an annual membership fee and pay per match (currently £2.50, plus 50p if less than 48 hours notice is given), with passengers paying 3p per mile to the driver. To ensure security all members are issued with a personal identification card (with photo) which should be shown at the start of each journey. All matches must be made through the Company although it is then the responsibility of the passenger to make contact with the driver to make the detailed arrangements.

For further details, contact Craig Forsyth at The Travelshare Company, 25 Low Friar Street, Newcastle upon Tyne NE1 5UE; Tel. 091 222 0090.

RCEP TO STUDY OIL POLLUTION

Following completion of their study on transport and the environment (due for publication next year), the Royal Commission on Environmental Pollution is to examine the environmental problems associated with soil. The primary focus of the study will be the UK, but trends in other parts of the world will also be taken into account, particularly the extent to which food production and the diversity of natural species are affected.

The RCEP will be inviting evidence for its study in 1994 and particular areas of interest will include

- contamination from all sources;
- recycling of wastes onto agricultural land;
- reclamation of contaminated soil;
- implications of climate change for soils;
- effectiveness of existing policies in ensuring that soils are used in a sustainable way.

NEW ENVIRONMENT MINISTER

Baroness Denton has replaced Lord Strathclyde at the Department of Environment. Lady Denton is the Minister responsible for ecolabelling and supports Tim Yeo on environmental protection, water and rural affairs. Lady Denton was previously Parliamentary Under Secretary for Small Firms, Consumer Affairs and Design at the DTI and her place has been taken by Lord Straythclyde.

LITTER ADVISORY GROUP

The Litter Advisory Group, which was set up on 13 September, will be reporting to the Environment Secretary on how legislation controlling litter can be strengthened and made more effective. The group includes representatives of central and local government, waste management and environmental health organisations.

NRA WATER RESOURCES STRATEGY

The National Rivers Authority's *'NRA Water Resources Strategy'* published in August outlines its approach to managing water resources in order to achieve the right balance between the needs of the environment and those of water users. It also sets out in detail the legislative, financial and institutional framework within which the National Rivers Authority operates, and provides a brief summary of the present status of water resources in England and Wales.

Key objectives of the strategy fall into the following areas:

- **Sustainable development of water resources:** this includes developing and implementing a system for assessing the availability of surface and ground water resources; setting environmental quality standards to support licence determination, and where necessary, setting statutory minimum acceptable river flows. Environmental assessments will be required in support of licence applications.
- **Assessment of reasonable needs of abstractors:** the NRA will press water supply companies to use water wisely. This will include the need to reduce leakage to economic levels and promote the introduction or selective domestic metering where resources are stressed; encourage more efficient use of water by industry and agriculture; revoke licences or reduce authorised quantities where there is no need for the original licensed quantities; promote the sharing of developed resources rather than authorise new abstractions; and review levels of abstraction in terms of sustainability and proper use.
- **Planning and development of water resources:** the NRA will publish three-yearly forecasts of demands and resources. A national water resources development strategy, identifying options for meeting additional demand, will be published early in 1994.
- **Provision of hydrometric and environmental data:** the NRA will develop and improve techniques for the collection, analysis and archiving of data, whilst ensuring that it provides a cost-effective and consistent level of service in this area. The NRA will take into account the data needs of other NRA functions, and of external bodies, and make data available to them.

BOOKS AND REPORTS

GENERATION IN THE 1990s
Electricity Capacity and New Power Projects

Oxford Economic Research Associates, 1993. ISBN 873482094.

Dieter Helm and his colleagues at OXERA have once again coupled a perceptive analysis of policy developments in the electricity sector with an up to date review of the status of all known electricity generation projects. The implications of Parliamentary and Government reviews of the coal industry and the Economic Purchasing Review by the Office of Electricity Generation are dissected, and placed in the context of developments in the electricity market, and possible outcomes of the forthcoming nuclear review. The results of this analysis inform scenarios for development of fuel mix and generation capactiy during the five years to 1998, and high and low rates for gas penetration in the fuel market.

Overall, the dash for gas does not seem to be proceeding at the pace predicted last year, so the margin of excess generating capacity is less than expected. Nevertheless, there will be severe competition for baseload generation, within which coal is the most likely loser. If there are uncertainties between now and 1998, there are even greater pressures on UK industry, or what remains of it.

Hopefully OXERA will continue to analyse and chart development of the energy sector with the insight and quality established over the last three years. There is certainly a great need for its services if we are to sustain informed debate in this vital area of environmental, economic and social policy. *Tom Crossett*

INVESTIGATION OF POLLUTANT EMISSIONS FROM CREMATORIA

D. Mitchell, A. Loader, Warren Spring Laboratory, 1992. £10.00 ISBN 0856247685.

This report, commissioned by the Department of the Environment, describes pollutant emissions from two cremation units – one new, modified to comply with EPA requirements, and an old, unmodified unit. Emissions of CO, SO_2, HC1, HF heavy metals and dioxins and furans were measured. Levels of dioxin emission were found to be unexpectedly high, and the report calls for further investigation.

ENERGY MANAGEMENT

CBI, 1993. £2.00. ISBN 0852014481.

These guidelines provide an easy to read overview of implementing energy efficiency measures within the corporate environment. They cover reasons for improving energy efficiency, principles of energy management, areas to survey and where to go for further help.

CODE OF PRACTICE ON ENVIRONMENTAL MATTERS

Available from The Hon Secretary, County Surveyors' Society, Dorset CC, County Hall, Dorchester DT1 1XJ. £10 inc p & p.

Published in June 1993, this Code from the County Surveyors' Society looks at the wide range of responsibilities of county highway authorities from policy formulation through to the improvement and maintenance of roads and the management of traffic and their effect on the environment. It takes as a starting point the need to balance sustainable transport policies with the need to provide for the effective movement of people and goods. It makes a number of recommendations which it is hoped will enable county highway authorities to fulfill their day-to-day responsibilities for managing highways in an environmentally sensitive manner.

THE LONDON AIR QUALITY MANUAL

J. Rice, S. Beavers, South East Institute of Public Health, 1993. £95.00.

A comprehensive 200 page manual produced in collaboration with the Association of London Authorities and the London Boroughs Association. It has been designed to assist local authorities in producing reliable monitoring results. The manual covers background information on the main pollutants, equipment selection, siting criteria, standard procedures and documentation, achieving quality data and data handling and analysis.

GREENING ECONOMIC DEVELOPMENT

How local authorities have integrated economic and environmental approaches

CAG Management Consultants, Local Government Management Board, 1993. £30.00 (£15.00 to local authorities).

This report seeks to explain why it is important to treat the relationship between economic development and the environment in a more balanced manner, in the context of local Agenda 21. It includes case studies showing how many local authorities are already approaching their economic development strategies and projects from an environmental perspective.

THE ENVIRONMENT AND THE PLANNING SYSTEM: BUSINESS IMPLICATIONS

P. Bulleid, Technical Communications Ltd., 1993. £25.75. ISBN 0946655790.

An overview of planning in relation to the environment and the environmental constraints in land development. It is a concise guide aimed at managers unfamiliar with the issues. The book provides an overview of the issues, supported by case studies.

PLANNING FOR A SUSTAINABLE ENVIRONMENT

A. Blowers (ed), Earthscan, 1993. £15.95, ISBN 185383145X.

This report represents the concerns of the Town and Country Planning Association on the interpretation and implementation of sustainable development. It aims to present some of the ways in which sustainability principles can be built into planning practice. Chapters cover natural resources, energy policy, waste, the built environment and economic aspects of development.

INDOOR AND OUTDOOR AIR POLLUTION AND HUMAN CANCER

L. Tomatis (ed), Springer-Verlag, 1993. DM 168.00 ISBN 354056647.

A collection of papers from the European School of Oncology examining the relationship between air pollution and cancer. It covers sources of pollution, assessment of exposure and effect, evidence for carcinogenicity and epidemiological evidence.

DESULPHURISATION 3

IChemE Symposium Series No 131, Institution of Chemical Engineers, 1993. £40.00, ISBN 0852953038.

The papers from the third international conference on desulphurisation, held in Sheffield in March 1993, are published in this volume. Contents include: Reduction of sulphur emissions – European, UK and industry perspective; a review of Drax FGD projects; absorption of sulphur in flue gases by seawater and the application of desulphurisation techniques to industrial coal fired stokers in the UK.

FUNDAMENTALS OF ENVIRONMENTAL CHEMISTRY

S.E. Manahan, Lewis, 1993. £25.00. ISBN 087371587X.

A book written to provide those with no background in chemistry with a fundamental knowledge, and to present it within a framework of environmental science. It provides a comprehensive introduction to basic chemistry, and builds on this to introduce water, waste, land and atmospheric pollution, toxicological chemstry and resources and energy. Excellent for chemophobes.

BUSINESS AND ENVIRONMENTAL ACCOUNTABILITY
An overview and guide to the literature

L. Grayson. H. Woolston, J. Tanega. Technical Communications, 1993. £28.00. ISBN 0946655820.

An overview and sourcebook for anyone needing to learn more about business and the environment. Chapters cover The Green Challenge to Business, Legislation and Policy – Europe and UK, Stewardship and Accountability and The American Experience.

ENVIRONMENTAL LIABILITIES AND REGULATION IN EUROPE

M. Brealey, International Business Publishing, 1993. ISBN 9080133310.

A legal treatise covering environmental legislation in the EC and 20 European countries. It is aimed at companies and consultancies who need to assess potential liabilities in those countries. It also provides practical information on relevant authorities and minimising risk of prosecution.

VDI 2006: MEASUREMENT OF PARTICULATE MATTER. MANUAL DUST MEASUREMENT IN FLOWING GASES.

Part 2 — Gravimetric Determination of Dust Load. Tubular Filter Devices ($4\ m^3/h$ $12\ m^3/h$). Part 7 — Gravimetric Determination of Dust Load. Plane Filter Devices.

Available from: Beuth Verlag, P.O. Box 11 45, 10772 Berlin, Germany, August 1993. Price DM 47,30 each.

The gravimetric determination of dust load in flowing gases is carried out to measure particulate emissions; the efficiency of dust separators is determined and the procedure used as a reference method for the calibration of monitoring instruments for particulate matter.

Following from Guideline VDI 2066 Part 1 the particularities specific to the tubular filter and plane filter devices and to their application are dealt with. Both are characterised by the arrangement of the separator just behind the sampling probe.

In Part 2 the two types of sampling systems described are designed for maximum gas flow rates of 4 and 12 m^3/h respectively. Higher sampling flow rates (12 m^3/h) are used for low dust content. The method is tested practically for dust content in the range from 1 to 1000 mg/m^3. For dust content less than 20 mg/m^3 the tubular filter device has to be used with a combination of a stuffed bush and a plane filter installed behind.

In Part 7 the separator is brought into the exhaust gas duct. The details concerning the shape and dimensions of the separator differ from those given in Guideline VDI 2066 Part 1 because of the latest findings. By revising Part 1 these details will also be adopted. The method is tested practically for dust content in the range from 0.1 to 20 mg/m^3. For dust content in the range between 0.1 and 5 mg/m^3 the weighing has to fulfill enhanced demands. All parts of the sampling equipment following the plane filter device are in accordance with Guideline VDI 2066 Part 2.

SOME LIKE IT HOT

A. Markham, N. Dudley, S. Stolton, Worldwide Fund for Nature, 1993. £11.99 ISBN 2880851300.

This report aims to provide an up to date review of scientific thinking on potential impacts of climate on biodiversity, and to consider the implications for conservation planning and management. It examines ecosystems at risk and species and genetic diversity. Colourfully illustrated, the book is accessible to non specialists as well as those working in the field.

FIRE IN THE ENVIRONMENT

The Ecological, Atmospheric and Climatic Importance of Vegetation Fires

P. J. Crutzen, J.G. Goldammer (eds), John Wiley & Sons Ltd., 1993. £8.00. ISBN 0471936049.

Fires, natural and anthropogenic, have contributed to the process of shaping and maintaining forest and savannah ecosystems, but patterns are changing. These are proceedings of a workshop convened to promote a multidisciplinary approach to studying the effects of vegetation fires on the biopshere.

TRANSPORT FOR A SUSTAINABLE FUTURE
The Case for Europe

J. Whitelegg, Belhaven Press, 1993. £37.50. ISBN 18529314590.

The central concern of this book is the dependence of society on motorised transport — both for travel and for the transport of goods. Chapters cover air pollution issues; health; time pollution; costs and the European context.

UVB RADIATION AND OZONE DEPLETION
Effects on Humans, Animals, Plants, Microorganisms and Materials

M. Tevini (ed), Lewis, 1993. £64.00 ISBN 0873719115.

The book presents latest findings on the environmental effects of ozone layer depletion. Topics covered include uv radiation in the atmosphere; effects of ozone depletion on uv and animal, human and plant health and tropospheric air quality.

Workplace Atmospheres — Size fraction definitions for measurement of airborne particles BS EN 481: BS 6069: Section 3.5: 1993.

Available from the British Standards Institution.

FUTURE EVENTS

25 NOVEMBER — THE TRANSPORT OF WASTE

Conference sessions will look at European and International rules; UK legislation including duty of care and moving waste by road and rail.
Venue: Waldorf Hotel, London WC2.
Details: Christine Rickards, IBC Legal Studies & Services. Tel: 071-637 4383.

26 NOVEMBER —
THE WASTE MANAGEMENT LICENSING REGULATIONS

In anticipation that the new regulations will be introduced soon, this conference will examine them in detail including: obtaining a licence; site aftercare; the role of the WRA; technical competence; and European waste management strategy.
Venue: Waldorf Hotel, London WC2.
Details: Christine Rickards, IBC Legal Studies & Services. Tel: 071-637 4383.

6-7 DECEMBER —
GEOGRAPHICAL INFORMATION SYSTEMS AND THE ENVIRONMENT

To introduce GIS this course will outline its relevance and applications in the field of

environmental management and studies, review available systems and data sources, EIA, environmental monitoring and the modelling of man/physical environmental systems.
Venue: University of Leeds.
Details: Julie Charlton. Tel: 0532 332 498.

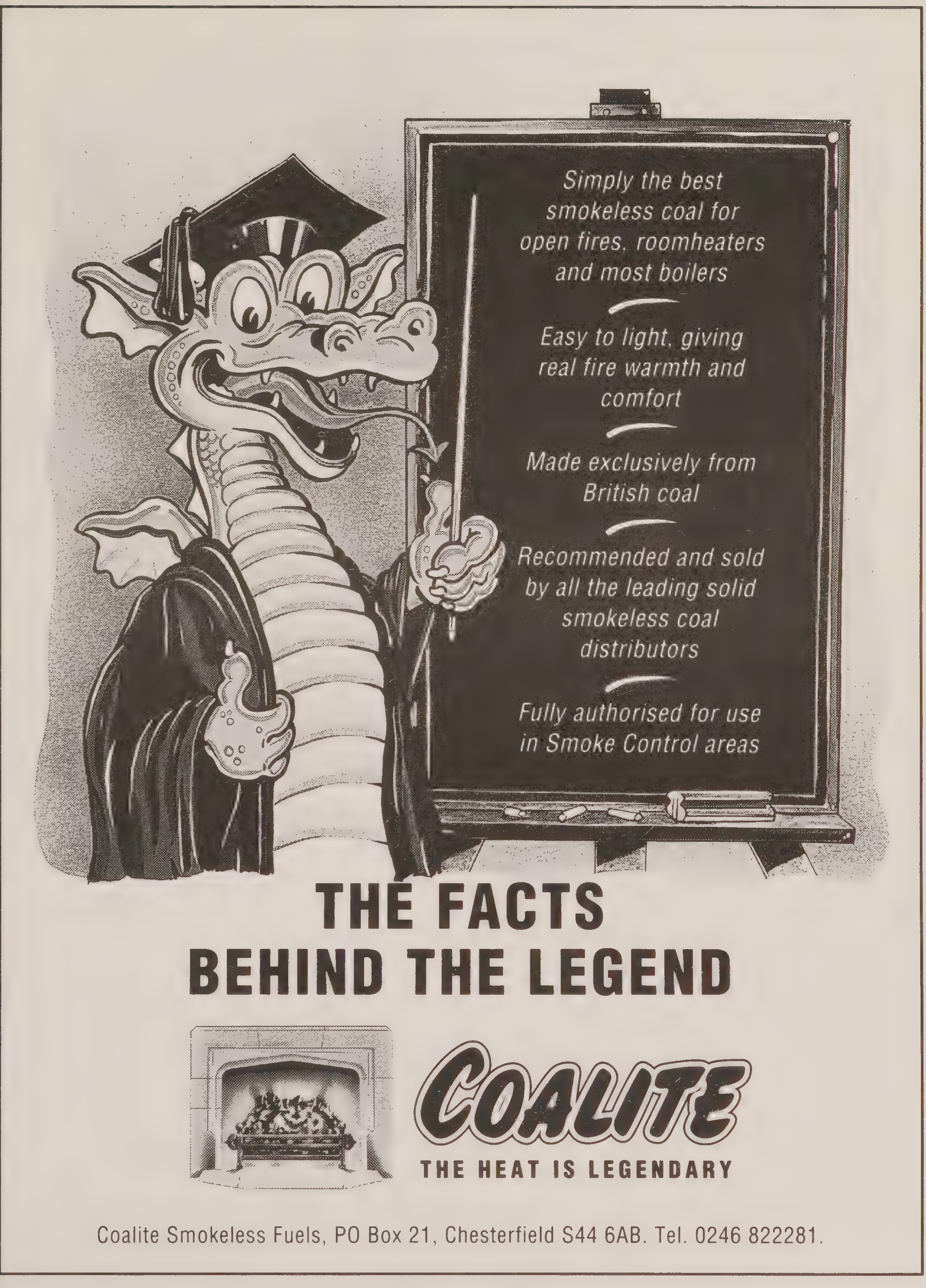
7 DECEMBER — TREATMENT AND DISPOSAL OF CHEMICAL WASTE
This course will review the current situation and indicate the direction of future policy and practice, and show how higher standards of disposal can be achieved cost-effectively. It is aimed chiefly at chemical waste producers, researchers, local authorities, NRA and HMIP.
Venue: University of Sheffield.
Details: Maria Elliott, University of Sheffield. Tel: 0742 768653.

10 DECEMBER — TRANSPORT AND CLIMATE CHANGE CONFERENCE
This conference is taking place on Global Climate Alliance Action Day; during the morning speakers will look at climate change impacts and the role of transport and the implications of current and projected transport policy in the UK and EC. The afternoon sessions will look at delivering sustainable transport policy and how transport is related to the Rio conventions. NSCA is a co-sponsor of this conference.
Venue: Geographical Society, London.
Details: CAN UK, 21 Tower Street, London SW2H 9NS

13-15 DECEMBER — INTERNATIONAL SYMPOSIUM NON-CO2 GREENHOUSE GASES: WHY AND HOW TO CONTROL?
Organised by the Society for Clean Air in The Netherlands, in cooperation with its European sister-associations (including NSCA), this symposium will look at scientific understanding (sources, emissions, atmospheric chemistry, sinks, budgets and modelling); technical options (abiotic and biotic).
Venue: Maastricht, The Netherlands.
Details: Dr. J. van Ham, CLAN, Tel: (+ 31-15) 696 884.

1994

24-25 JANUARY —
CONTAMINATED LAND: POLICY, REGULATED AND TECHNOLOGY
Particular emphasis will be paid to dealing with contamination within a risk management framework embracing not only risks to human health and the environment, but also potential liabilities for those reclaiming or developing contaminated sites.
Venue: SAS Portman Hotel, London W1.
Details: Amanda Wright, IBC Technical Services. Tel: 071-637 4383.



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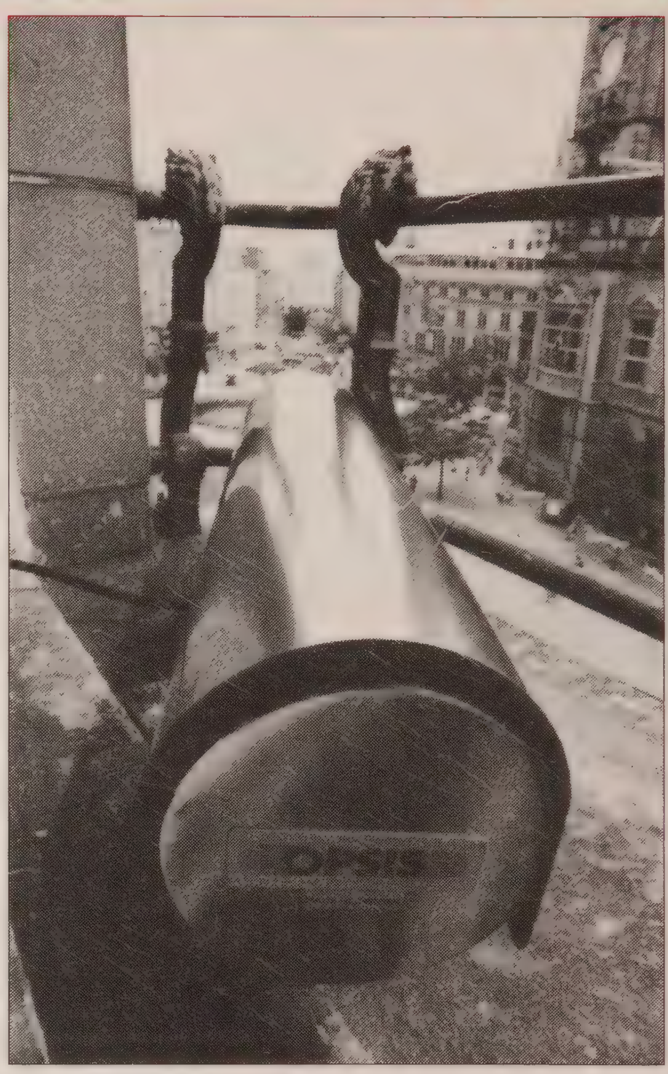

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WINTER 1993

Volume 23 **Number Four**

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CONTENTS

Editorial 151
Environmental Protection 1994
— Call for Papers 152
NSCA News
— Presidential Address, Lord Lewis of Newnham 153
— Conference Report 1993 160
— Annual General Meeting 161
— Council Appointments 162
— South East Division 163
— Scottish Division 163
— NSCA Crop Residue Burning Survey 1993 164
NSCA Views
— Society Policy on Unleaded Petrol 169
— The Future Development of the Common Transport Policy 169
— Remedying Environmental Damage 170
— NSCA Policy Statements and Resource Documents, September-December 1993 172
Reports
— Local Authority Air Pollution Monitoring — A Necessary Function, David Muir 173
— Planning and Pollution Control: A European Dimension, Christopher E. Miller 183
— Trends in Rural and Urban Nitrogen Dioxide Diffusion Tube Monitoring across Leicestershire, Malcolm Fox 189
— Recent Developments in Airborne Dust Monitoring, David Mark and David Hall 193
Update 218
Books and Reports 221
Future Events 223
Advertisers
— HMSO 192
— Coalite Smokeless Fuels cvr iii
— Enviro Technology Services Plc cvr iv

NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

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EDITORIAL

MAKING THE MOST OF MEMBERSHIP

New Year is the time for introspection and resolution. What are we about? How can we be more effective?

We in NSCA are about a better world. We are about protecting the environment in the interests of health and conservation. At the same time we are realistic, responsible and practical people. We know that our decisions should be based on objective analysis rather than emotion. We are aware that we must take economic and social factors into account when determining our priorities for environmental action. We shall need to think more in 1994 but this should not mean less action. If this is to be the case we must be able to share knowledge and experience more widely, more perceptively and faster than ever.

In short the need for the Society has never been stronger. But how can we be more effective? How can we improve the speed, breadth and focus of our communication network?

At both national and divisional level we should involve an ever wider cross section of the community in our activities and respond to the wider perceptions which will result. We should also build constructive partnerships with organisations which overlap our interests in subject areas such as development planning, waste and energy management, conservation of the natural and built environments, transport and industrial competitiveness.

We should also improve the communication process. During the past year we have fed back to the Committees the conclusions which have been reached at seminars and workshops. The valuable knowledge and experience exposed at these meetings has thus been incorporated into Society policy wherever this was appropriate.

This issue of *Clean Air* reports two developments which should also enhance communication.

On page 172 there is a list of policy statements and replies to consultation documents which the Society published during the final quarter of 1993. The majority of these statements are based upon a trawl of members' expert views. Because of their objectivity they command considerable respect in Government, commerce and the media. The capacity to produce authoritative views is one of our greatest strengths but we believe that members do not take full advantage of it. Please look at the list, ask for any titles which interest you and use them if you can. And if you can't, please let us know why — that way we shall get better faster.

The coordinators of the local air quality management information exchange network tell you about it in a supplement to this issue. It is not for the editorial to steal their thunder by going into detail, but an open special interest group under the auspices of the Technical Committee in an area of central importance is an immense opportunity and challenge.

Overall the Society is the members and exists to meet your needs. Effectiveness depends on feedback. Council and Divisional Councils hope that we shall hear more from you in 1994, and meet many of you at our Divisional meetings, national seminars and of course at that most important annual event for environmental protection specialists, the NSCA Conference. This year we visit Blackpool; we hope the dates (24-27 October) are already pencilled into your diary!

ENVIRONMENTAL PROTECTION 94
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CALL FOR PAPERS

Every year the NSCA Conference addresses a wide range of issues concerned with assessing and minimising the environmental impact of industry, transport, agriculture and the domestic sector with emphasis on energy conservation and waste minimisation or safe disposal.

If you have relevant knowledge or practical experience in dealing with topical problems, you should consider giving a 15 minute paper at the conference.

We invite potential authors to submit one-page proposals summarising the scope of the paper along with its title, the name of the author, his/her affiliation and a contact address and telephone number.

Proposals should reach NSCA at the address below by 1 April. Authors will be notified in May. The conference registration fee will be reduced for any author invited to give a 15 minute paper.

The Secretary General
NSCA
136 North Street, Brighton BN1 1RG
Fax: 0273 735802

NSCA NEWS

ENVIRONMENTAL PROTECTION 1993

PRESIDENTIAL ADDRESS

Lord Lewis of Newnham
Chairman of the Royal Commission
on Environmental Pollution, 1985-1992

First of all may I say how delighted and honoured I was when you very kindly offered me the position as President of the Society. It is somewhat overpowering when you look at the list of people who have preceded me, but nevertheless I say with genuine honesty that I am delighted to be with you today.

The NSCA is one of the oldest active groups in this country in the study and appreciation of environmental problems. It is interesting to reflect that, in environmental terms, the UK is generally considered to be very often far behind Europe. In historical terms, however, I believe England is one of the earliest participants in environmental thinking and even in legislation; for example, a Royal Proclamation made by Edward I in 1306 prohibited the use of sea-coal in London. In fact it is reported that one poor creature who violated the Proclamation was executed — I think you could call this a limiting form of pollution control.

Jumping on a bit, John Evelyn, who was a founder member of the Royal Society, wrote his book *Fumifugium*, or *The Inconvenience of the Aer and Smoake of London Dissipated* and suggested as early as 1661 the removal of all coal burning industry to four miles from London and the establishment of a Green Belt. In fact, the first book that was published by the Royal Society was by John Evelyn, on the disappearance of forests in this country. So we have a large tradition, certainly in the concept of air conservation, which goes back a long way.

Equally when we look at water the Royal Commissions of 1856 and 1857 were in part responsible for the *River Pollution Acts.* The work of John Snow in the nineteenth century studying the outbreak of cholera is probably one of the first real epidemiological studies that was ever undertaken, and this demonstrates the long tradition of this type of study in this country. Despite this, however, early studies often failed to link problems — for instance the polluting effect that a graveyard could have on nearby water supplies: it was a lack of knowledge and correlation that often occurred. In many of these instances the Royal Commissions were important mechanisms for concentrating political thought and providing the impetus for legislation. I have merely to remind this audience of 1863 and the *Alkali Act,* which occurred as a result of the

Royal Commission of 1862. From that, of course, arose the Inspectorate and hence much of the concern about air pollution.

I would now like to give some background on the work of the Royal Commissions, and in particular those which were concerned with environmental pollution. The current Royal Commission on Environmental Pollution was set up in 1970 under the then chairmanship of Sir Eric Ashby, who became Lord Ashby. Its terms of reference were "to advise on matters both national and international concerning the pollution of the environment, the adequacy of research in this field, and the future possibilities of danger to the environment." It was not set up as a watchdog nor as an ombudsman, but was basically there to make this, as a separate study, characteristic of the behaviour of a Royal Commission.

I think you will agree that the inclusion of the words "national" and "international" was a very far-sighted act at the time – 1970. Now, of course, one of the important features of modern day studies in pollution has been the recognition that it is often very broadly based – a point of view which NSCA was largely responsible for advancing. However, I would still reflect with you that although this is absolutely true, pollution is recognised first on the local, then on the regional, then the national and finally on the international scale, so we should not get this particular order out of perspective.

The RCEP's reports to date are listed in Table 1. The early reports – under Eric Ashby's chairmanship – are an incredible reflection of the assessment of pollution problems. In fact they are prophetic in many ways in their assessment of the situation. For those of you who have not already done so – may I suggest that the first three reports are well worth reading. But of particular interest to the NSCA is the Fifth Report (1976), which was chaired by the then Sir Brian Flowers, later Lord Flowers, who is also a Past President of NSCA. This brought forward the idea of Integrated Pollution Control (IPC). It also brought forward the concept of BPEO and considered the whole problem of transboundary pollution. I think that this Report is indeed a very important and monumental development in our concept of pollution as a whole.

NSCA was one of the principal contributors to that Report; it submitted evidence and later appeared before the Commission. Its views – as well as the many others whose names appear in the report – must have greatly influenced the thinking of that particular Royal Commission.

I would like now to reflect on a very important point about the Royal Commissions. A Royal Commission, as defined by Lord Flowers, is not an expert committee: it is a committee of experts. In other words, what we have are people, often of very diverse interests, who will sit and listen and be persuaded, but they require both the persuasion and the information to arrive at any conclusion. It is Societies such as the NSCA that are paramount in contributing in this particular way. I think it is fair to say that this was certainly the case for the 5th Report.

The concept of transboundary pollution immediately generated the whole concept of environmental problems in a worldwide sense, and this has come up with such things as acid rain, global warming, depletion of the ozone layer, and biodiversity – all issues which were very much to the fore at the Earth Summit in Brazil in 1992. It is often interesting to reflect on what was the real purpose of the Brazil Conference. My own belief is that it *existed*, and that seems to me to be the most important single factor about the whole operation: the fact that people as a whole had now got to a situation where they were prepared genuinely to meet and discuss these particular factors.

One consequence of the Conference was Agenda 21. This is essentially a requirement on governments to prepare national strategies for sustainable development and to submit these to the new Commission for Sustainable Development. The EC countries have taken this one stage forward, and agreed to do so by the end of 1993. I am sure that a number of you have seen – and the NSCA has already responded to – the Government consultative paper on the UK's Strategy for Sustainable Development. May I say I believe that there are other consequences of this particular commitment, inasmuch as I think it may have concentrated Government thinking on other issues as well. But it is important to realise that the concept of sustainability is one that is very much to the forefront; as defined in the Brundtland Report it is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. I think that particular phrase has got a ring of truth to it: it has an appeal and an acceptance within society. But as often happens with so many things in environmental studies, when you start looking at it closely it is not quite as easy to understand. And this presupposes the impact of environmental problems can be assessed – often a very difficult feature of modern day thinking. It requires good science as a basis; it requires measurement; it requires monitoring. These are all features which have got to be developed, and which frequently change according to circumstance.

The Royal Commission decided, when I was involved in it, to look at Best Practicable Environmental Option (BPEO), what it meant in reality and how it could be implemented in practice. The important feature about BPEO was that it arose in part because HM Inspectorate of Pollution had recently been established and BPEO was a tactical approach to assessing pollution problems. We decided to look at BPEO because there was a feeling among certain members of the Commission that perhaps HMIP were not implementing it as the Commission believed it should be done. Once again, this illustrates some of the great problems there are in environmental problems as a whole. First of all, what do we mean by the 'best practicable environmental option', I remember the debates on 'practicable' and what this actually meant. By the time we had gone through that one, it was with a certain relief, as Chairman, I thought it's going to be easier from there. But if you thought 'practicable' was difficult, 'best' was even more difficult to define, and is a very, very subjective feature.

One of the important points that came out of that report was to suggest the way you looked at the BPEO – the best practicable environmental option – was to reverse the term. You first of all isolated all the options, you then assessed their environmental consequences, which was not an easy thing to do; and then you talked about which was more practicable, and then which was best. The important feature was that you listed all alternatives, and you concentrated on environmental – not economic, not social, but *environmental* – options. That, in our belief, was how you applied this particular process. But you did this by itemising them in such a way that if anything changed, and one knows that in environmental problems there is constant change, then you could re-assess quickly and see whether this involved a change in your approach and solution to your particular problem. This was termed an “Audit Trail”.

Recently HMIP held a seminar on environmental and economic assessments for IPC at which they outlined their thinking on how this related to the implementation of BPEO, and the determination of site specific BATNEEC for IPC processes. At the moment they are thinking about producing ‘tolerability quotients’ for each release of a pollutant to each medium which would then be summed to produce a total TQ for a process — the BPEO index. I see that NSCA has given its initial thoughts to HMIP and has criticised the concept in its current form. May I say immediately that it is very easy to criticise these sort of situations but in fact I think NSCA is absolutely right in its criticisms of this particular process. It is often very difficult to generalise, but I think one of the great difficulties here has been that one wants to come up with a singular answer. HMIP is planning a detailed consultation exercise on its plans and no doubt many of you will be responding.

An important feature of the whole of this development is the formation of the Environmental Agency for England and Wales to be effected by the merger of HMIP, NRA, and the waste regulatory functions of local authorities. There is a hole in this particular thing, and I am delighted that the NSCA has taken up and is going to look at local air quality characteristics in the form of a workshop. I am sure that this is a very important feature which must be included in the Agency. Nigel Haigh is going to be talking about the various types of agencies tomorrow. The EC Environment Agency is of importance here too. I am sure that Sir Hugh Rossi tomorrow will discuss some aspects of the EC Environmental Agency, the establishment of which has been delayed until now for various reasons. I think that the important feature, as far as I am concerned, about the whole of this, is the suggestion that was made by Michael Heseltine when he was the Secretary of State for the Environment, that we must have an audit of the particular techniques that are going to be used across the Community as a whole in making assessments of environmental procedures.

The point that worries me, in general terms, about many environmental problems, is that people like to give everything a number. We are living in a numerate society, and the difficulty of living in a numerate society is that people like to feel happy with a number. Universities have been suffering from this for quite a period of time; departments have been classified as five, or four, or three, or two, or one. These are very complicated organisms. It is like me trying to take any individual in this audience and give them a number: I am sure that there would be objections, certainly there would be on my part if I were to put a foot in that procedure.

Can I just illustrate this with one very simple example that came from a study that the RCEP were doing on freshwater quality. Here we found that there were indeed three quinquennial surveys to assess the quality of waters, and that these had been carried out since 1980. The water standards are based on the National Water Council's classification, and are claimed to give a general picture of the state of the aquatic environment. The rivers were classified into one of five groups with 1A, 1B, 2, 3, 4 as the numbers; it's a subtle point, the 1A and 1B, and it always reminds me how the 2 class degree is divided into a 2.1 and a 2.2 — it's a similar sort of problem which faces them.

But the important feature is that the actual standards were based on the toxicity of the waters for fish. They involve an analysis of the chemical content of three components: the dissolved oxygen, the biological oxygen demand (which was a factor which came out of a very early Royal Commission dealing with sewage in the 1895-1915 period), and ammonia concentration. These parameters do give a very good indication that you are concerned with organic pollution from sources such as sewage and animal waste, which is what they were designed for. But it does not give an adequate picture of the overall state of a river. So, in order to make this a little bit more acceptable, a subjective adjustment was given; this leads to considerable complications when you try to make comparisons between regions and from one survey to the next. In fact, if you take the same stretch of water, you can classify it as either 1A or 3, depending upon whether the ammonia concentration was judged against European Fisheries Commission criteria or the EC Water Directive, both of which the NWC scheme purports to include. So you can see the dangers. This is highly emotive, because once this gets into the press, into the media, it has tremendous impact. This leads very often to considerable local concern which in turn leads to large sums of money being invested to get things right. I am not against money being spent in order to do things, as long as we know what it is we are spending the money for.

I am, however, concerned that this ability to give a number without explaining the limitation of the number is a very important problem that must be faced. The current system also does not — and this was suggested by the Royal Commission survey — involve the biology of the system. The NRA has in fact recently put forward suggestions to look at a scheme which involves a wider range of chemical components and also a biological assay, and produce this as a mechanism of talking about river quality.

Another related topic is groundwater. You can monitor rivers, and rivers are monitored, but groundwater in this country is not monitored as a whole. In the European Community 70% of public water is from groundwater supplies; in this country it is about a third, although in the South East it is about 75%. Groundwater supplies are extremely sensitive, and very often irreversible sources, which cannot readily be actually replenished. The NRA is dealing with this problem and has built up the concept of source protection zones and vulnerability maps, which I think it is important to accept.

It is however with more than a degree of disappointment that I have noted recently that the Government has now decided to defer its Register of Contaminated Land. Contaminated land is potentially one of the biggest problems when dealing with groundwater. This has been brought into stark relief recently by the judgement of the Cambridge Water Company versus the Eastern County leather companies. To summarise, the Cambridge Water Company put down a borehole in 1979; in the same area there was a tannery company cleaning its hides by using chlorinated organic solvents, which it stopped using in 1976. In 1980 the borehole was found to be contaminated by these chlorinated hydrocarbons, and in the 1990s a prosecution was brought against this firm, and now it has been found in favour. This is a form of retrospective legislation which is going to be quite important and, if this case goes before the House of Lords and is agreed to, it will result in a re-examination of the whole concept of contamination and will make certain people rather sensitive. But this just illustrates another very important feature. The European Commission has recently published a Green Paper on environmental liability. Liability is a very difficult thing to assess in many instances, but I think the case of the tannery company touches very much on the issues raised by the Commission's discussion document.

From reading NSCA's Annual Report, I know that you have some concerns about various farming practices. This is also an area the RCEP looked at during its study of freshwater quality and I am now firmly of the opinion that in many instances farming has become the equivalent of industry and will require the same sort of controls. If you take high intensity breeding units, they are enormous in size and the pollution problems are equally enormous. To give a simple example — please forgive me if I use chemistry as the example. If we consider the output of a polyester plant and the uses of this for the manufacture of clothing. The equivalent amount of wool to make cloth would require twelve million sheep. The dangers of dealing with a chemical plant are well known and have been logically dealt with for a period of time. However twelve million sheep, which would roughly take up an area the size of Belgium to graze, are an enormous source of pollution and one which is recognised by the NRA. It is important at some stage or other to try to get these different but equally serious problems into general perspective.

Another issue I want to touch on is the situation of the polluter pays principle. This is something that has been implicit and quite explicit in environmental thinking for a long time. Once again, however, I think it returns to a point I was making earlier: it is an assessment, and it is an economic assessment, and one must get to a situation of recognising that, generally speaking, regulation means the mechanism of control. The use of economic instruments is one that is currently gaining much credence and indeed the RCEP's Freshwater Quality Report also has a very good chapter on economic assessment. Undoubtedly this is something that is going to have to be done, but it certainly makes it extremely difficult to make assessments as a whole.

Turning to another of the NSCA's interests — the problem of noise from the production of energy. The problems of noise from windmills is causing concern in some quarters. There can be little doubt that if you are talking about lifecycle analyses, which is the convenient way of looking at many things today — it used to be called cradle-to-grave analysis but it really is a total energy assessment — you can get a different answer depending upon what you feed into the various equations. It is a highly emotional problem as far as society is concerned — witness the debate over the use of disposable or washable nappies. But the windmill problem is very simple: they were put there essentially to save energy and there is little doubt that they do this. They have many advantages over the use of fossil fuels, but of course have a noise problem associated with them. So in environmental terms you have these two things to balance: can I call it the aesthetic (the appearance and noise of the windmills) and the chemical (the fuel to be burnt), and you have to make a comparison between the "environmental" impact of these two various features. These are not insoluble problems, but they do require to be addressed and may provide different individual consideration.

Finally if I can just turn to the point that worries me perhaps most of all, and that is the problem that was dealt with by Lord Nathan's Sub Committee F (9th Report 1991-

92 on Implementation and Enforcement of Environmental Legislation), of how one deals with the implementation of various forms of legislation. There is no doubt that the legislation is coming fast and furious, very often from a European source. In the above report Lord Nathan points out that "the implementation of EC regulations is done with great enthusiasm (perhaps too great for legislation)". But he also quotes a statement that was made by another of NSCA's Vice-Presidents, Dr. Caroline Jackson, who is a Member of the European Parliament; she says that "too often, adoption of law is seen as the end of the procedure, and then we all go down on our knees and hope and pray that something happens"; this, to me is one of the difficulties we have when we talk about the European legislation system. We want to be convinced that everybody is doing it the same way, that the rules are the same, and that one set isn't doing it in another way. We all suspect that is what is happening. However, I think it is vitally important that at some stage or other we have got to rationalise this particular approach, and that means getting back to two very important points. First, you have got to understand the science you are dealing with, and second you have to understand the way you are measuring it or monitoring it. I am sure NSCA has for many years been paramount in doing exactly those two things.

Table 1: Royal Commission on Environmental Pollution Reports 1971-1993

First Report (1971)
2nd: Three Issues in Industrial Pollution (1972)
3rd: Pollution in some British Estuaries and Coastal Waters (1972)
4th: Pollution Control: Progress and Problems (1974)
5th: Air Pollution Control: An Integrated Approach (1976)
6th: Nuclear Power and the Environment (1976)
7th: Agriculture and Pollution (1979)
8th: Oil Pollution of the Sea (1981)
9th: Lead in the Environment (1983)
10th: Tackling Pollution — Experience and Prospects (1984)
11th: Managing Waste: the Duty of Care (1985)
12th: Best Practicable Environmental Option (1988)
13th: The Release of Genetically Engineered Organisms to the Environment (1989)
14th: GENHAZ — A System for the Critical Appraisal of Proposals to Release GMOs into the Environment (1991)
15th: Emissions from Heavy Duty Diesel Vehicles (1991)
16th: Freshwater Quality (1992)
17th: Incineration of Waste (1993)

CONFERENCE REPORT 1993

Environmental Protection 1993 – NSCA's annual conference – attracted nearly 350 delegates to our 'home' in Brighton. NSCA's new President, Lord Jack Lewis, gave the keynote address on the opening evening. As usual, the conference programme was wide-ranging: the first session looked at Who Protects the Environment with papers focussing on the prospects for a UK environmental agency, the role of local authorities, industry and of economic instruments. Environmental Planning and Management looked at the role of planning and transport planning in environmental protection and practical experiences of BS 7750 and the EC Eco-Management and Audit Regulation. Papers on critical loads, contaminated land, waste minimisation and energy efficiency made up the session on Conserving Land, Water and Energy, with further sessions on noise and air quality for health.

Following the success of 1992's informal workshop on waste disposal, two were included in the 1993 programme – one on experience to date with Part B process authorisations and a second on Local Agenda 21 initiatives. The majority of papers from the conference were available to delegates at the conference: papers received subsequently are being circulated to all delegates.

Environmental Protection 1994 travels to Blackpool – our first visit since 1986. Programme planning has already started and staff in Brighton are liaising closely with the North West Division which has set up a special working group to help with the planning. An outline of the programme appears on page 152 of this edition of *Clean Air* together with a Call for Papers.

Lord Lewis of Newnham, NSCA President 1993-94.

Geof Kaufman, Chairman of Council 1993-94, with outgoing Chairman, Prof. Jim Harrison.

ANNUAL GENERAL MEETING

This year's Annual General Meeting, held prior to NSCA's Annual Conference on 4 October, saw the election of a new President – Lord Jack Lewis of Newnham – who takes over from Baroness Platt of Writtle, and of a new Hon. Treasurer – Richard Hill – who takes over from Brian Edwick.

Lord Lewis, whose Presidential Address to the opening session of Conference appears earlier in this edition of *Clean Air*, was Chairman of the Royal Commission on Environmental Pollution from 1985-1992. Lord Lewis paid tribute to the role of NSCA in promoting environmental issues over the years and said that he was keen to participate in the work of the Society during his period of office. In presenting Baroness Platt with her past President's medal, Lord Lewis expressed the Society's appreciation for all her efforts on its behalf.

Brian Edwick, who was also elected an Hon. Member of the NSCA at the AGM, has been NSCA's Hon. Treasurer for 13 years. Professor Jim Harrison, outgoing Chairman of the Council, thanked Brian on behalf of the members and staff for his wise counsel over the years – as a result of his direction the accounts are now being presented in a much clearer way and he leaves the Society in a much stronger position. As a mark of the Society's gratitude, Professor Harrison presented Brian with a portable radio cassette player. In thanking the Society, Brian said that he had intended to cease being Hon. Treasurer on his retirement five years ago but owing to the enjoyable nature of overseeing the NSCA's books, he had decided to continue.

In presenting the Society's 1992-93 Annual Report, Professor Jim Harrison noted that while its areas of interest had widened from smoke control, smoke and its effects on clean air were still a priority; thus the Society had not welcomed the Government's plans to abolish clean air grants which has been an important element in helping local authorities to meet air quality standards for smoke and sulphur dioxide. He commended to those present the Society's emphasis in the forthcoming year on local air quality management and characterisation and the setting up of a small network to advise on the direction this work should take; one of the Network's first tasks is to advise on the planning of the Society's Spring Workshop which will focus on this area.

In addition to Brian Edwick, three members of the East Midlands Division were also elected to Hon. Membership – the four new members have a total of 98 years service to the Society between them. Ron Chamberlain was Chairman of the East Midlands Division 1987-88 and of the Conference and Promotions Committee 1990-92 and has been a member of the National Council for 19 years. Joe Hall has been a member of the East Midlands Division since 1963 both as a local authority representative and as an individual member. John Marsh's association with NSCA goes back some 23 years and he was Chairman of the East Midlands Division 1984-85.

Two members of the Scottish Division were the Society's first recipients of Certificates of Commendation for their work in promoting the Society particularly at regional level, but also nationally. Ian MacPherson has been a member of the Society for 33 years and is a former President of the Scottish Division and member of the

National Council and Technical Committee. Crawford Morgan was instrumental in the re-establishment after many years inactivity of the Scottish Division; following re-establishment, he was elected Hon. Secretary in 1990, a post he held until February 1993. He played a major part in securing a grant from the Scottish Office for the Division's activities and has played a key role, with the help of other members of the Scottish Executive in organising a number of highly successful seminars all of which have resulted in a rapidly increasing membership North of the Border.

Brian Edwick receives his retirement gift from Prof. Jim Harrison (Chairman, 1992-93).

COUNCIL APPOINTMENTS

At the October Council meeting, also held immediately prior to Conference, Geof Kaufman was elected Chairman for the year 1993-94. Geof represents the North West Division on the Council and was Hon. Secretary of that Division for several years. He is Borough Public Protection Manager at Tameside MBC and a member of the Manchester Area Pollution Advisory Council. Deputy Chairmen for 1993-94 are Cllr. Dr. John R.P. Evans, Vice-Chairman of the South and Mid-Wales Division of NSCA and George Barrett who represents PowerGen on the National Council.

SOUTH EAST DIVISION

In November the Hon. Secretary, J.J. Beagle, addressed the Ealing branch of Friends of the Earth on the effects of pollution on the environment together with a speaker from the National Asthma Campaign. He spoke about the work of the NSCA and its efforts to reduce pollution. The link between asthma and pollution from motor vehicles was discussed but although not proven is suspect. Lancaster University has just published the results of a two year project by its Environmental Epidemiology Unit involving 1000 households in 10 cities in Northern England and Scotland which purports to show that people living near heavy traffic suffer more ill health including symptons of respiratory difficulties.

Obviously more research is necessary on this subject which was one of the topics discussed at a seminar, also in November, which the Division held with the South East Institute of Public Health. Pollution Partnership: Environmental Health, Planning and Public Health brought together doctors, EHOs, meteorologists, consultants, planners and several students from the London School of Hygiene and Tropical Medicine. Dr Tom Crossett was in the chair. The key speaker was Dr R. Maynard Senior Medical Officer of the DOH who inter-alia spoke about the links between pollution and health. Other speakers dealt with the changing trends in air quality since 1950, e.g the decline in coal combustion and the rise in motor vehicle pollution. Pollution and health were constant themes, and here again the link between asthma and pollution came under scrutiny. Regional pollution was mentioned in East Sussex where some of the highest concentrations of ozone in the UK have been recorded. Industrial pollution on Canvey Island from the oil refineries and gas storage facilities gave rise to local complaints, e.g the "Canvey cough". Here it is hoped to undertake research into the effects of pollution on health. Planning for Pollution highlighted the challenges facing planners now that the government expected planning decisions to take into account air pollution affecting health and the quality of the environment. The afternoon sessions were devoted to workshops on the problems presented by pollution on health, the environment and planning from contaminated land, transport and industry.

SCOTTISH DIVISION

A seminar on noise and pollution sampling and monitoring was held in August 1993. The seminar was offered as a package or delegates could opt to attend a single session.

Session one on noise included presentations on a noise complaint investigations protocol, noise standards and criteria, low frequency noise, and L_{90} vs Leq as a baseline noise descriptor in environmental assessment.

The second session included presentations on monitoring instrumentation for Part B processes, IEHO emission monitoring package, water quality monitoring and sampling, and landfill gas monitoring.

A brief synopsis of all the presentations is available from Clare Carruthers, NSCA Scottish Division, City of Glasgow, EH Department, 23 Montrose Street, Glasgow G1 1RN.

NSCA CROP RESIDUE BURNING SURVEY 1993

On 29 June 1993 *The Crop Residues (Burning) Regulations 1993* finally came into force, banning the burning of the following crop residues: cereal straw and stubble, residues of field beans and peas harvested dry and oilseed rape. Burning of these may only occur in the following circumstances: education or research; to comply with a notice served under the *Plant Health (Great Britain) Order 1993* and to dispose of broken bales and the remains of straw stacks. The burning of linseed residues has been exempted from the ban until 1995, when its status will be reviewed in the light of contemporary alternative disposal methods.

NSCA has repeated its annual crop burning survey, to assess the effectiveness of the regulations and to highlight any problems environmental health departments are experiencing in enforcement.

Crop residue burning regulations do not apply to Scotland and Northern Ireland.

RESULTS

Total number of local authorities in England and Wales	404
Total number of returns	336
Returns providing information	224
Nil returns	112

OVERVIEW

1. Is it your impression that burning in your area has:

a.	Ceased completely	111
b.	Ceased, apart from exempted burning	88
c.	Some illegal burning	20
d.	not known	5

Of those areas where burning has occurred in previous years, 50% reported that burning had ceased completely, 39% reported exempted burning and 9% reported illegal burning.

2. Which methods have been used to dispose of crop residues:

a.	mainly incorporation	25
b.	mainly baling	25
c.	a mixture of both	70
d.	not known	104

Only about half of authorities were aware of methods of disposal being used, however there appears to be an even split between incorporation and baling.

3. If any burning took place, was this:

		no. of notifications
a.	linseed residues	947
b.	under article 22 of the *Plant Health (Great Britain) Order 1993*	0
c.	education or research	45
d.	straw stack remains or broken bales	438
e.	illegal burning	89

Linseed is the main crop residue being burnt. The burning of broken bales is also widespread. A number of authorities expressed concern that this may be subject to abuse — the practice can create a large amount of smoke and once burnt, it is impossible to prove abuse of the regulations. Burning grass on set-aside was also a cause for concern — authorities experienced difficulty in identifying set-aside land.

Several authorities considered that herbage seed residues should also be covered by the regulations.

OBSERVATION OF REGULATIONS

4. If burning took place, were there any problems with:

a.	firebreak requirements	5
b.	firefighting equipment	5
c.	fire supervision	5
d.	ash incorporation	1
e.	notification of relevant authorities	25
f.	burning after sunset/weekends	3
g.	other	10

Non-notification was the main problem experienced — mainly in relation to the burning of bales.

5. If burning took place, did you receive any complaints?

yes	52	no. of complaints	139
no	172		

The number of authorities receiving complaints has halved compared with previous years. Many complaints were from members of the public unaware of exemptions to the ban. Affected authorities feel that pre-ban publicity did not make it clear that some burning would still be allowed.

PROSECUTIONS

6. Do you intend to prosecute for any breach of regulations in 1993?

yes	7
no	217
No. of prosecutions pending	5

Difficulties in collecting evidence to enable prosecution were experienced — usually due to lack of notification and low priority given to surveillance.

EFFECTIVENESS OF REGULATIONS

7. Overall, do you consider that the operation of the regulations in 1993 proved effective for prevention of burning:

yes	195
no	2
not known	27

Overall the regulations are deemed effective and are welcomed by local authorities. Many, where burning was a serious problem up until last year, expressed their amazement at the degree of compliance, and relief at the improvement in summer air quality.

COMMENTS

Only one authority questioned the validity of a ban relative to the costs of ploughing in, increased use of pesticides etc. Some felt that the exceptionally wet summer would have had an effect on burning practices, and several noted that the burning season was not over by the survey deadline of 1 October (this observation has not been made in previous years, and may have been due to the exceptionally wet conditions).

OVERVIEW

Calls to the NSCA office revealed that some authorities were unclear as to their powers to enforce the regulations – but MAFF has confirmed to us that power of enforcement does lie with district authorities, and is set out in the *Local Government Act 1972*, s. 222.

Crop residue burning has declined steadily over the past three years. However, in view of the intractable attitude of farmers in some of the large cereal growing areas in the past, compliance with the ban has been excellent. Several authorities who, up until last year, experienced serious problems, expressed 'amazement' at the level of compliance.

The main cause for concern is the abuse of the 'broken bales' exemption. Some authorities have seen a suspiciously high number of these and suspect farmers of building bonfires. The practice creates widespread smoke nuisance and notifications are rare.

Cherwell District Council raised the problem of burning on set-aside with MAFF and received the following reply:

> 'The management rules for set-aside land require farmers to have a green cover, either sown or naturally regenerated to prevent nitrate leaching. In 1992/93 they were required to cut their set-aside at least once to keep weeds under control. It was never our intention that growers would be able to burn off the cover, and although the rules for 1992/93 did not specifically preclude it, they did so implicitly by requiring cuttings to be left on the ground, and by prohibiting any preparations for sowing the next crop, apart from cultivating the land to create a bare fallow.
>
> The rules for 1993/94 specifically prohibit the burning of set-aside land in the

Arable Area Payments scheme. This is clearly set out in volume II of the updated explanatory booklets on the scheme which are being sent out to all farmers. Farmers who choose to burn would be at risk of penalty for breach of the management rules.'

Hopefully new guidance will eradicate the problem.

CONCLUSION

Overall, the regulations are a success and have provided welcome relief from summertime smoke and smuts in many areas of the country. The majority of local authorities feel they are effective.

Many of the complaints received were from members of the public unaware of exemptions to the ban – pre-ban publicity did not draw attention to the exemptions.

The only real cause for concern is abuse of the broken bales exemption – with non notification and spurious burning remaining a problem for many authorities.

AUTHORITIES PROVIDING INFORMATION

Adur DC
Arun DC
Ashfield DC
Ashford BC
Aylesbury Vale DC
Babergh DC
Barking & Dagenham LB
Barnet LB
Barngley MBC
Barrow in Furness BC
Basildon DC
Basingstoke & Dean BC
Bassetlaw DC
Bearsden & Milngavie DC
Bedford CC
Berwick upon Tweed BC
Beverley BC
Bexley LB
Blaby DC
Blyth Valley BC
Boothferry BC
Bradford MBC
Braintree DC
Breckland DC
Brentwood BC
Bridgnorth DC
Brighton BC
Broadland DC
Bromley LB
Broxbourne BC
Broxtowe BC
Calderdale MBC
Cannock Chase DC
Canterbury CC
Caradon DC
Carlisle CC
Carrickfergus BC
Castle Morpeth BC
Charnwood BC
Chelmsford BC
Cheltenham BC
Cherwell DC
Chester CC
Chesterfield BC
Chester-le-Street DC
Cleethorpes BC
Colchester BC
Colwyn BC
Congleton BC
Corby BC
Cotswold DC
Croydon LB
Dacorum BC
Darlington BC
Dartford BC
Daventry DC
Dover DC
Easington DC
East Dorset DC
East Hants DC
East Hertfordshire DC
East Lindsey DC
East Lothian DC
East Northants DC
East Staffordshire BC
Ellesmere Port & Neston BC
Elmbridge DC
Epping Forest DC
Erewash BC
Exeter CC
Fareham BC
Fenland DC
Forest Heath DC
Forest of Dean DC
Gateshead MBC
Glyndwr DC
Gravesham BC
Great Grimsby BC
Great Yarmouth BC
Guildford BC
Hambleton DC
Harborough DC
Harlow DC
Harrogate BC
Hart DC
Havering LB
Holderness BC
Horsham DC
Hull DC
Huntingdonshire DC
Kennet DC
Kettering BC
Kings Lynn BC
Knowsley MBC
Leeds CC
Leominster DC
Lewes DC
Lichfield DC
Lincoln CC
Luton BC
Macclesfield BC

Maldon DC
Malvern Hills DC
Mansfield DC
Medina BC
Meirionnydd DC
Melton BC
Mendip DC
Mid Beds DC
Mid Devon DC
Mid Suffolk DC
Mid Sussex DC
Monmouth BC
Newark & Sherwood DC
Newbury DC
New Forest DC
North Wiltshire DC
Northampton DC
Northavon DC
North Cornwall DC
North Devon DC
North Dorset DC
North Hertfordshire DC
North Kesteven DC
North Norfolk DC
North Tyneside DC
North Warwickshire BC
Nottingham CC
Oadby & Wigston BC
Ogwr BC
Orkney Islands
Oswestry BC
Pendle BC
Radnorshire
Reading BC
Redbridge LB
Reigate & Banstead BC
Rhuddlan BC
Richmondshire DC
Rochester-upon-Medway CC
Rochford MBC
Rotherham MBC
Rugby BC
Rushcliffe BC
Rutland DC
Ryedale DC
Salisbury DC
Scarborough BC
Sedgefield DC
Sedgemoor DC
Selby DC
Sevenoaks DC
Sheffield CC
Shetland Islands
Shrewsbury & Atcham
South Bedfordshire DC
South Buckinghamshire DC
South Cambridgeshire DC
South Derbyshire DC
South Hams DC
South Herefordshire DC
South Holland DC
South Kesteven DC
South Lakeland DC
South Norfolk CC
South Northants DC
South Pembrokeshire DC
South Shropshire DC
South Somerset DC
South Staffordshire DC
Southwark LB
Stafford BC
Staffordshire
Moorlands DC
St Albans DC
St Edmondsbury BC
St Helens MBC
Stratford-on-Avon DC
Stroud DC
Suffolk Coastal DC
Sunderland CC
Swale BC
Taunton Deane BC
Teesdale DC
Teignbridge DC
Test Valley BC
Tewkesbury BC
Thamesdown BC
Three Rivers DC
Thurrock BC
Tonbridge & Malling BC
Torbay BC
Torridge DC
Uttlesford DC
Vale of Glamorgan BC
Vale of White Horse DC
Wakefield MDC
Walsall MBC
Wansbeck DC
Wansdyke DC
Warrington BC
Waveney DC
Waverley BC
Wealden DC
Wellingborough BC
West Devon BC
West Dorset BC
West Lancashire DC
West Lindsey DC
West Lothian DC
West Oxfordshire DC
West Somerset DC
West Wiltshire DC
Weymouth & Portland BC
Wigtown DC
Windsor & Maidenhead RB
Wrekin C
Wychavon DC
Wycombe DC
Wyre Forest DC

NB. Includes Scottish and N. Ireland.

NSCA VIEWS

SOCIETY POLICY ON UNLEADED PETROL

NSCA members may have seen an article in the *Sunday Times* of 12 December 1993 claiming that the Society had "withdrawn its approval" for unleaded petrol because of concern about benzene emissions. This is quite untrue; the article quoted selectively from a long briefing given to the journalist in question and seriously misrepresented the Society's position.

Lead is a known poison which accumulates in the environment; the case for taking lead out of petrol remains as strong as ever. The risks of benzene with respect to lead must be put into perspective with some urgency. There are uncertainties about the health effects of benzene, and the possible contribution of various formulations of leaded and unleaded petrol to benzene levels in the atmosphere. On the first question, air quality guidance from the Department of the Environment is expected in early 1994. On the second, there is a need for the pooling of data on any links between the chemical composition of petrol and benzene emissions — particularly those from the combustion of fuel — before the potential for any environmental impact can be assessed. Only then will it be possible to assess any risk to the public and to discuss measures which might reduce that risk.

It would be wrong for motorists to revert to using leaded fuel. There is also the danger that those with catalyst-equipped cars will try to use leaded fuel, thus permanently deactivating the catalyst and worsening air quality across a broad range of pollutants. The essential issue is not whether leaded petrol is "better" than unleaded, but whether forthcoming health guidelines on benzene might justify some reformulation of unleaded petrol.

THE FUTURE DEVELOPMENT OF THE COMMON TRANSPORT POLICY (COM(92) 494)

Enquiry by House of Lords European Communities Committee, Sub-Committee B

The European Community Fifth Action Programme for the Environment "Towards Sustainability" identifies five main target sectors, including transport. It sets a framework based on environmental targets, and the measures and instruments necessary to achieve them. The EC Green Paper "A Community Strategy for Sustainable Mobility" (COM(92) 46) further elaborates proposals for a transport strategy "based on a global approach [which] would promote sustainable mobility by integrating transport into an overall pattern of sustainable development".

The European Commission is now developing a European model for sustainable development which seeks to identify indicators for the target sectors in the Fifth Action Programme. Indicators such as traffic noise and vehicle emissions feature prominently in this analysis.

In its evidence to the House of Lords European Communities Committee, Sub-Committee B Enquiry (October 1993), NSCA expressed the view that the UK Government seems intent on decoupling national transport policy from initiatives at European Union level. In its consultation paper on the UK Sustainability Strategy it has failed to commit itself to a target-based approach for national policy and gives scant consideration to the Fifth Action Programme (see *Clean Air,* Autumn 1993).

NSCA suggests there is a need for agreement on environmental, economic and social objectives at national and international levels. Emphasis should be given to objectives which address quality of life issues and to the development of appropriate indicators to measure this. In the Transport sector, air quality and economic objectives must be weighed against social factors which are less easily measured — accessibility, community disruption, social equity, noise intrusion, etc.

The overall impact of transport policies and plans needs to be subjected to strategic environmental assessment at European Union level to ensure that the environmental externalities and unpaid costs of road transport are fairly shared between member states and do not lead to market distortion.

An equitable balance between social, environmental and economic objectives will require the adoption of common methodologies of strategic policy assessment, common emission standards and common objectives for implementation and enforcement.

A full copy of NSCA's evidence to the House of Lords is available from Sally May at NSCA, tel: 0273 326313.

EUROPEAN COMMISSION GREEN PAPER REMEDYING ENVIRONMENTAL DAMAGE (COM(93) 47)

In March 1993 the European Commission published a discussion document on remedying environmental damage. The paper starts from the basic premise that it is better to prevent damage in the first place rather than to have to take remedial action, but that where damage has occurred then the polluter should pay. The paper discusses the way in which a civil liability regime might work for those instances where the polluter is known; for damage to the environment which cannot readily be attributed, a joint compensation fund is suggested.

The House of Lords European Communities Committee (Sub-Committee C) has been considering the Green Paper. NSCA's evidence to the Sub-Committee follows.

NSCA drew attention to the financial implications of the EC Green Paper which, it said, are uncertain but potentially very large and the implications for statutory regulation which are unclear. It is in the interests of industry, the regulators and the public to remove as much uncertainty and to introduce as much clarity as is possible, as quickly as possible.

Agreeing the detail of the EC-wide framework for civil liability will inevitably take time but NSCA considers that steps should be taken in the short term to secure agreement on which of the wide range of options identified in the EC proposals can be ruled out and which can be ruled in for further discussion. This should at least narrow the limits of uncertainty and set the agenda for future negotiations.

The Society believes that the following principles should guide UK policy:

1. The UK Government believes the subject inappropriate for EC action on the basis of subsidiarity. However an inconsistent approach could mean some member states imposing large insurance or compensation fund obligations on industries, leading to competitive disadvantage. The likelihood of market distortion dictates that this is very clearly an appropriate matter for EC consideration.
2. We believe that the implication of the polluter pays principle is that liability follows responsibility, whether or not fault can be proven. This would focus minds on environmental responsibility and encourage industry, plus their insurers and lenders, to uphold standards of environmental management. Industries with appropriate management structures in place should have little to fear. There should thus be a presumption in favour of strict liability in future to act as incentive to environmental responsibility. However limited “Act of God” defences should be available.
3. It can be difficult to attribute historical responsibility, particularly for land contamination. The line of strict liability should be drawn now; it is less easy to make a case for strict liability retrospectively if it can be shown that polluters were acting in good faith at the time. Thus any retrospective action should be fault-based.
4. The degree of interest and relative effectiveness of individuals, regulators and NGOs will vary between member states. In the interests of environmental protection statutory authorities, aggrieved individuals and public interest groups should all be allowed to seek remediation or compensation, including damage to the unowned environment.
5. Where compensation or costs are recovered in civil action, a proportion should be transferred to a joint compensation fund for remedying historical damage where liability cannot be established or attributed. In the UK this should be administered by the Environment Agency and Scottish Environmental Protection Agency. Other sources of funding should be considered.
6. Degrees of environmental damage and acceptable levels of remediation are hard to define. Developing guidelines on interpretation of “environmental damage”, setting consistent standards for remediation, and assessing the extent of the problem in the UK will be a matter for the EA and SEPA. At EC level, monitoring for consistency will be a matter for the EC Environmental Agency.

NSCA POLICY STATEMENTS AND REPLIES TO CONSULTATION DOCUMENTS

September-December 1993

As a service to members, each issue of *Clean Air* will now contain a list of NSCA policy documents and our responses to consultation documents (including the date of response). Some of these are also available in *Clean Air* and the appropriate reference is given. If you would like a copy of any particular document not published in *Clean Air*, please write to Sally May at NSCA, 136 North Street, Brighton BN1 1RG.

Paying for Better Motorways — Issues for Discussion. DOT, 1 September. See *Clean Air*, Vol 23, No. 3.

Eco-Management & Audit Scheme and BS 7750. DOE, 10 September.

Infringement of Privacy (Noise) Consultation Paper, The Lord Chancellor's Department and the Scottish Office. 22 September.

UK Strategy for Sustainable Development. DOE (29 September). See *Clean Air*, Vol 23, No. 3.

Citizen's Charter Indicators: Proposals for 1994-95. Audit Commission, 1 October.

NSCA Survey of Local Authority Air Pollution Monitoring. *Clean Air*, Vol 23, No. 3.

EPA 1990: Draft Waste Management Paper No. 25 — Clinical Waste. DOE, 21 October.

EPA 1990: Local Authority Air Pollution Control — Solvent Substitution in Vapour Degreasing Equipment. DOE, 26 October.

Legal Remedies for Damage to the Environment. European Communities Committee C, House of Lords, 16 November. See this issue of *Clean Air*.

Code of Practice on Environmental Noise Control at Concerts. The Noise Council, 23 November.

Standard Spending Assessment. Environment Committee, House of Lords, 26 November.

Development of the Common Transport Policy. European Communities Committee Sub-Committee B (Energy, Industry & Transport), 7 December. Summary in this issue of *Clean Air*.

The Future of Air Quality Monitoring Networks in the UK. DOE, 9 December. Summary included in Air Quality Management supplement to this issue of *Clean Air*.

Environment Agencies — letters to the Secretaries of State for The Environment, Scotland and Wales, 20 December.

Noise Insulation Regulations for New Railways. DOT, 22 December.

REPORTS

LOCAL AUTHORITY AIR POLLUTION MONITORING
A NECESSARY FUNCTION

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Bristol City Council

Introduction

The rôle of air pollution monitoring by local authorities in the United Kingdom is a vexed one. Brown(1) has reviewed a number of opinions on the threats to such monitoring and this paper is intended to extend the argument in favour of such monitoring.

Currently there is no absolute, clear statutory requirement for local authorities to carry out such monitoring but legislation such as the *Clean Air Act 1993, Environmental Protection Act 1990* and the *Local Government Act 1972* all contain clauses which imply to varying degrees both that such monitoring can be carried out and, in some cases, possibly should be carried out. The *Air Quality Standards Regulations 1989*, which enact three EC Directives into United Kingdom legislation further cloud the picture by specifying pollutant concentrations which must not be exceeded but without defining how compliance is to be monitored and achieved. This situation, however, could change when the EC Air Quality Framework Directive finally makes its appearance.

The situation is further complicated by the inputs that such monitoring can have to the planning procedure and to the highway function of the appropriate body. The scope of these aspects, where monitoring is carried out, can vary dramatically from area to area depending on the degree of co-operation between the various departments.

Clearly there are many aspects to air pollution monitoring which need to be considered if such monitoring is to be carried out and more importantly if it is to be carried out effectively. Some of these will now be reviewed.

The Legal Situation

As has already been stated the legislative position on air quality monitoring is open to degrees of interpretation. Of the four pieces of legislation referred to above the relevant sections of the first three are:

- *Clean Air Act 1993*
  Section 79 (1) A local authority may:

(a) undertake, or contribute towards the cost of, investigation and research relevant to the problem of air pollution;
(b) arrange for the publication of information on that problem.

- *Environmental Protection Act 1990*
  Section 19 deals with the obtaining of information for enforcement of the legislation in respect of process authorisations; and
  Section 79 includes the statement:
  "it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisance which ought to be dealt with under Section 80 (of this Act) and where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint.
- *Local Government Act 1972*
  Section 222 (1). Where a local authority considers it expedient for the promotion or protection of the interests of the inhabitants of its area
  (a) they may prosecute or defend or appear in any legal proceedings and, in the case of civil proceedings, may institute them in its own name; and
  (b) they may, in their own name, make representations in the interest of the inhabitants at any public inquiry held by or on behalf of any Minister or public body under any enactment.

Of these the first is clear in that it in no way places an absolute requirement on the local authority to act but in the cases of the other two the functions of the local authority are clearly made very much more difficult, if not impossible, if no information is available. Whilst the *Local Government Act* provisions cover many aspects of local authority responsibilities other than air pollution those of the *Environmental Protection Act*, in respect of local authority enforcement of process authorisations, clearly require information on pollutant concentrations if successful enforcement action or monitoring of compliance with requirements is to be possible. The responsibility for routine monitoring of emissions lies with the process operator but it is possible that in some cases the local authority may not be satisfied that such monitoring is being carried out in a proper fashion.

Section 79 of the EPA presents certain paradoxes. It clearly refers to emissions of fumes, gases or smoke which are prejudicial to health or a nuisance but then confines the requirements to assess such emissions to premises. A report commissioned and published by the Department of the Environment(2) states that the "fumes and odours" arising from road traffic rank in public concern alongside the noise nuisance from traffic. The real paradox lies in the fact that if the emissions from road traffic were to come from fixed installations they would appear to fall within the provisions of Section 79. Certainly there is a growing body of opinion that vehicular emissions are prejudicial to health and there is clear evidence that they are considered a "nuisance" by many members of the general public even if the legislation does not consider them a "statutory nuisance". It is possible that there could be many interesting legal consequences if a sufficiently large group of inhabitants felt that their interests were not being adequately promoted by their local authority in respect of air quality due to a lack of monitoring (or in other non-statutory areas of responsibility). There are provisions for private action under Section 82 of this Act but without firm evidence from systematic monitoring it is unlikely that there would be any real prospects of success in any such action.

The situation with the Air Quality Standards Regulations is somewhat different. These enact EC Directives 82/884/EEC (lead), 80/779/EEC (smoke and sulphur dioxide) and 85/203/EEC (nitrogen dioxide). All of these specify Limit Values which must not be exceeded and the second and third specify Guide Values for general environmental improvement. Unfortunately whilst the Directives specify that monitoring should be carried out to ensure compliance with the Limit Values they only state that the member state shall carry out such monitoring not which body (or bodies) should do so. There are clear requirements that such monitoring must be carried out in locations where the Limit Values might be exceeded and there are target dates for both the establishment of monitoring programmes and for achievement of the standards required. In the case of nitrogen dioxide this is 1 January 1994. There were a number of derogations under the smoke and sulphur dioxide Directive but these expired on 1 April 1993. There has also been an amendment to the smoke and sulphur dioxide Directive, (89/427/EEC), which adds requirements for the replacement of "black smoke" measurements by total suspended particulates measured by the gravimetric method. To date this has not been enacted by United Kingdom legislation. A further Directive (92/72/EEC) requires health warnings to be issued when ozone concentrations exceed any one (or more) of three trigger levels. This Directive comes into effect in February 1994. It also has not been enacted by United Kingdom legislation but the hourly mean concentration has been adopted by the Department of the Environment as its warning level.

It is clear that the shortcomings of the earlier Directives have been recognised as the European Commission is now proposing a radical review of its legislation in relation to air quality.

The EC Air Quality Framework Directive

This proposal will replace the existing Directives with a tougher and more wide ranging two-tier mandatory system. Detail is still under discussion for the draft Directive but there are many strong indications as to the direction it will take.

The basic idea behind this type of Directive is, as their names suggest, to provide a framework within which "daughter Directives" will provide the detail.

Firstly the four current sets of Directive controls, smoke, sulphur dioxide, lead and nitrogen dioxide, and the one soon to come into effect, ozone, would be replaced by twenty or more substances subject to one, or more, of three forms of control. These would be:

- Limit Value – "statutory maximum"
- Guide Value – "presumption not to exceed"
- Alert threshold — "public warning"

These will probably bear at least some resemblance to the current criteria for the five pollutants currently subject to Directive control but they will be determined in a more consistent fashion. Of even greater interest is the fact that it appears that there will be standards for many environmental pollutants for which at present the only criteria are those contained in the World Health Organisation's Guidelines which are currently under review. These include carbon monoxide, cadmium and a number of organic substances including benzene. There is also scope for setting air quality objectives, which would be fixed at EC level, for a further range of substances if they contributed to air pollution problems in several member states.

The aims of these are to ensure that member states put into force programmes to attain the "Limit Values" within five years and to use the "Limit Values" and "Guide Values" to exert pressure to reduce ambient concentrations below "Guide Values". These objectives clearly require monitoring to be carried out on a far greater scale than is currently the case in the United Kingdom at least and the indications are that firm proposals will be made in this direction.

There is a considerable amount of uncertainty as to what the published draft Directive will contain on this subject but the following appear to be probable inclusions:

1. Where Limit Values are likely to be exceeded monitoring to commence by 1995.
2. Where Guide Values are likely to be exceeded monitoring to commence by 1997.
3. Monitoring techniques will be specified.
4. Areas where monitoring must be carried out will be specified.
5. The minimum number of sites will be specified.

Clearly much clarification is necessary but it is evident that for all but one or two of the pollutants considered, ozone as an area pollutant being the most obvious exception, the main thrust of any such monitoring must be targeted at the more densely populated areas. It is clear that some monitoring is already being carried out in such areas, in some cases under Central Government auspices, in others by local authorities, but if the current ideas are followed through it would mean a massive increase in the monitoring of air pollution. Clearly this would be a task beyond the immediate capacity of Central Government to implement and so there would appear to be an essential rôle for local authority monitoring to plug the gap.

There are currently moves in this direction with proposals to incorporate local authority monitoring sites within the national networks. This could provide a considerable expansion of valid monitoring capability but there are a range of issues which need to be addressed to achieve this end. The Department of the Environment has recently published a consultation paper(3) on the future of air pollution monitoring networks which points to a number of options on the integration of local authority monitoring into national networks.

There has been much talk of Environmental Protection Agencies for England and Wales and for Scotland to combine the functions of Her Majesty's Inspectorate of Pollution, the National Rivers Authority and some local authority functions but its formation has been deferred on a number of occasions. There is also no indication at present that such a body would encompass local authority air pollution monitoring as the proposals made in the Queen's speech to Parliament in November 1993 referred purely to the waste regulatory functions of local authorities. It should however be noted that the original proposals for the Scottish Agency do include local authority air pollution responsibilities.

The Implications For Local Authorities

There are many potential implications for local authorities in the matter of air pollution monitoring. First of all it will be necessary to decide upon the criteria for the areas where monitoring will be required. To date there have been a range of suggested sizes of towns or cities which would be the minimum size where monitoring would, or could, be required. These range from 50,000 to 250,000 so it is clear that there is a range of opinions already. It has been questioned(4) whether the widespread establishment of so many sites equipped with highly sophisticated equipment might not be a case of over-reaction and it must be admitted that this is a reasonable point of view especially as it is qualified by a realisation of the limitations of current monitoring.

There are, however, actions which could be taken at relatively little cost which might reflect a more balanced approach to the situation. This would, in the first instance, involve a requirement to assess the position and then to carry out properly validated monitoring if there were an identified potential problem.

Such assessment would involve a number of steps. The first would be a simple theoretical consideration of the situation in regard to each pollutant. For instance, new sites for lead monitoring can now only be seriously justified if there is a known industrial or commercial emitter as the concentrations of lead in urban air have fallen markedly since the reduction of lead in petrol and with the increase in use of unleaded petrol. Similarly both black smoke and sulphur dioxide concentrations have generally fallen since the passing of the *Clean Air Acts* 1956 and 1968 and the only area where new monitoring could be justified would be in the vicinity of a known emitter although there are strong grounds for an increased amount of roadside monitoring of sulphur dioxide and PM_{10} particulate as the proportion of diesel engined vehicles in the road fleet increases. Conversely there have been reports of general increases in the concentrations of oxides of nitrogen(5) at both urban and rural sites and there have been a number of instances of elevated concentrations of ozone, in particular at rural sites. Clearly these are areas where there would be clear justification for proceeding with an assessment.

As the major contributor to urban air pollution is road traffic it would be a relatively simple and inexpensive matter for any local authority which fell within the Directive criteria to carry out its own preliminary practical assessment by using nitrogen dioxide diffusion tubes. If this suggested that a problem, or potential problem, existed then monitoring for both oxides of nitrogen and carbon monoxide would be justified using the specified methods. In practice it is virtually certain there would be justification for such monitoring in any major city and also in many towns.

In the case of ozone there is less justification for extensive monitoring in central urban areas as there is a major sink for ozone in the form of nitric oxide from vehicle emissions but there are clear grounds for monitoring in rural areas or even on the outskirts of urban areas. As ozone is an area pollutant a realistic picture of its concentration distribution can be achieved with a smaller number of sites than is the case with other pollutants.

All of these are pollutants for which there is a reasonable database of information on concentrations at a range of sites although it has been recognised that there is a need for a far more extensive network(6) (or networks) even for these pollutants. A step has been taken along these lines with the UK Enhanced Urban Monitoring Initiative. Phase 1 of this involves the establishment of the Enhanced Urban Network (EUN) monitoring oxides of nitrogen, carbon monoxide, sulphur dioxide, ozone and PM_{10} particulate currently in nine cities and with three due to go on stream in 1994. The second phase of this initiative is the establishment of a parallel network to monitor gaseous hydrocarbons. This is an area where there is comparatively little information available at present and even such information is generally limited to a small number of compounds.

The integration of local authority monitoring with the national networks is not something which can be achieved at the press of a switch. The criteria for the national networks in part in terms of equipment specification but far more in terms if certification of calibration gases, procedures and Quality Assurance/Quality Control (QA/QC) are far stricter than is usually the case with local authority monitoring. This may be illustrated by the fact that final validation of results from the EUN runs some nine months behind the actual monitoring although it does seem in practice that there is generally good agreement between the provisional data and the final validated data and that as the network has operated for longer periods the capture rates for validated data have improved.

There is, however a firm base on which a good co-operative network could be built. The work carried out over the years by Warren Spring Laboratory (and shortly to become part of the new National Environmental Technology Centre's unit) has now reached a point at which certified calibration gases traceable to recognised national standards are available. These *must* form the first step in achieving properly validated local authority monitoring and any local authority considering carrying out monitoring using continuous analysers. The most vital factor in any type of air pollution monitoring is the QA/QC procedures followed. For the EUN this task is performed independently of the Local Site Operators by WSL. To have WSL perform this task for a large number of local authorities would clearly be a mammoth task. There is an alternative which, whilst not providing the independent checks which would be a major benefit of QA/QC by WSL, should mean that data from such monitoring would be capable of being used in a similar fashion to that from the national networks. This would involve the use of procedures drawn up for the London Boroughs Association and the Association of London Authorities by the South East Institute of Public Health(7). This document provides guidance on all aspects of choosing equipment and methods of monitoring, site selection and establishment and operational procedures. It is an essential requirement for any local authority considering carrying out systematic air pollution monitoring.

The Department of the Environment has recently published a consultation paper on the future of air pollution monitoring in the United Kingdom(8) which does recognise the importance of local authority monitoring and points the way forward to possible integration of local monitoring into the national networks.

Long Term or Short Term Monitoring?

One question which arises immediately is whether monitoring is to be long term or short term and who should actually do the monitoring. The simple answer to this is that both types of monitoring have their justification and the duration of monitoring depends entirely upon the circumstances.

Generally short term monitoring would seem to be most appropriate to assess the impact of (relatively) small-scale traffic schemes or for making spot checks for compliance with requirements laid down in Part B authorisations under EPA although there are circumstances where long term monitoring would be more appropriate. This latter application also covers checking monitoring carried out by or for the company concerned. In the case of EPA monitoring there are grounds for having this carried out by an independent consultant as it is quite likely that there would be needs for specialised equipment which would not have enough use to justify its purchase by the local authority. There is however the alternative of hiring such equipment if there is in-house expertise to operate it and to interpret the results.

Long term monitoring is, with one partial, and theoretical exception, the only means of assessing compliance with statutory requirements laid down in EC Directives on air quality. The partial exception is the new ozone Directive which is due to come into effect in 1994 and which requires the issuing of health warnings at appropriate trigger concentrations. In theory this could be achieved by simply carrying out monitoring, using a continuous analyser, only at such times as elevated concentrations of ozone might be expected. In practice this would not be a realistic approach.

The real value of long term monitoring is that it enables trends to be determined, it provides information for research into a range of factors influencing air pollution, it provides a robust means of assessing the impact of policy decisions and, perhaps most important, it provides information which can be related to health statistics to enable the links between pollution and health to be investigated in a meaningful manner. The important factor is that the data obtained must be used in such fashions rather than being accumulated for its own sake.

Work relating to the possible respiratory health effects of air pollution has been carried out widely in the United States but there has been a shortage of such work in recent years in the United Kingdom. This is in spite of a perceived increase in respiratory complaints which it has been suggested may be due to long or medium term exposure to *ambient* concentrations of atmospheric pollutants. Particular pollutants which have been suggested as possible causes or triggering factors in this are ozone, nitrogen dioxide and PM_{10} particulate.

Gradually work is being undertaken in this field in a number of regions including Bristol, Birmingham, Sheffield and Teeside but limitations on resources and confounding factors mean that progress will not be rapid.

There are other factors which need to be assessed in this field in relation to the carcinogenic effects of organic compounds whether as free atmospheric gases or as adsorbed compounds on fine particulate matter.

Future Developments

No monitoring programme should be allowed to sink into a state of stagnation. It is said with much justification that there is nothing permanent except change. This is particularly true in the field of air pollution and it is essential that any monitoring programme is regularly modified to take account of changing circumstances and newly identified problem areas. It is inevitable that there are going to be cases where measures to reduce pollution concentrations are effective but the hoped for result is either not fully achieved or is in part achieved through the influence of other factors, where there are improvements in one area but problems created in others or where a benefit is achieved but only at a cost which is out of proportion to that benefit. Two particular cases spring to mind to illustrate some aspects of these difficulties. The first is the reduction in smoke and sulphur dioxide referred to above. Whilst there can be no doubt that the *Clean Air Acts* and Smoke Control Programmes played a part in this reduction it has been suggested(9) that other factors such as people's desire for cleaner sources of domestic heating than coal fires led a demand for electric and gas heating. Then there is the consequence of the increased demand for electric power leading to problems with acid rain. The second example is lead in air. There has been a clear reduction in lead in air concentrations but the evidence suggests that the hoped for reduction in blood-lead levels has not been achieved(10). This is almost certainly an area where a more wide-ranging initial examination of the problem might have led to different policies being adopted. The key factor which appears to have been overlooked in this case is that lead in air is only one source, and a relatively minor source at that, for blood-lead in children. It is probable that concentrations of lead in dust and lead in soil are more important factors and not, in the latter case, because of entry of lead into the food chain but because of direct ingestion. There is evidence(11) to suggest that concentrations of lead in roadside dust fell slightly following the reduction in the concentration of lead in petrol *where traffic flows remained stable.* Where the flows increased markedly the concentration of lead in dust also rose.

These issues raise the question of the extent to which investigations of air pollution should be confined strictly to the atmosphere or should consider the impacts on other media. In the case of acid rain the case is clear that it is the impact of the acidic gases on lakes and vegetation which is the whole point of investigation and control measures. It would be naive to consider, for instance, road traffic related pollution purely in the context of the gaseous pollutants and particulate matter in the atmosphere without considering the impact of run-off from road surfaces into water-courses and the composition of roadside dust.

The work referred to above on the health effects of pollution is a particularly important field and is one where co-operation between national and local bodies would be invaluable. There have been moves in this direction with the establishment of the Institute of Environment and Health at Leicester University by the Department of the Environment and the Department of Health but again the success of this body ultimately depends on the provision of adequate funding.

There is a growing suspicion that emissions from diesel engined road vehicles, in particular particulates, may be a more important factor than had been previously thought. More detail on the reasoning behind this theory will be available shortly(12). Another area where long term monitoring data is very important is in the field of research into atmospheric chemistry. Recent years have seen increasing numbers of episodes of elevated concentrations of nitrogen dixoxide in winter months most notably in London but also in other cities. These episodes are frequently characterised by rates of rise in concentration of nitrogen dioxide which do not appear to be in line with the slow oxidation of nitric oxide by oxygen and which cannot be attributed to the fast reaction of nitric oxide with ozone as concentrations of the latter are at their lowest levels at the times of year when these episodes occur. Long term monitoring data can also provide valuable information for studying the relationships between meteorological factors and pollutant concentrations. There are two closly related areas of benefit in this, one is the potential of the ability to predict air quality either by sophisticated computer techniques such as the Swedish INDIC system or by simpler methods, the second is the ability to model air pollution, especially in complex urban areas.

There are also a number of questions not only on the impact of local emissions on perceived global problems (eg. carbon dioxide and other gases and global warming) but also the impacts of the perceived global problems on local problems. One case which immediately presents itself is the possible influence of altered spectral patterns of solar radiation caused by *global* ozone depletion on atmospheric chemistry and there are no doubt other such possible effects.

Conclusions

Whilst air pollution monitoring is not a clear statutory requirement on local authorities at present there are clear reasons why such monitoring is necessary. These include:

1. The present national networks do not provide the necessary range of data for a full assessment of the situation in the United Kingdom.
2. The forthcoming EC Air Quality Framework Directive seems certain to require a far wider range of validated monitoring than is currently carried out. The provision of such monitoring would be a task which could not be achieved purely by National Government action with the best of wills.
3. The growing suspicions of links between ambient concentrations of air pollution and ill health and the need for further investigations of these links place some form of moral duty on all authorities to provide the necessary information to prove or disprove these theories.

Some of the recommendations of the Quality of Urban Air Review Group in relation to monitoring could be achieved fairly quickly if local authority monitoring could be properly integrated into the existing networks. Prominent amongst these is the recommendation that additional monitoring is strongly justified at both kerbside and suburban sites to provide a more complete picture of air pollution than exists at present.

It is evident that the type of integration which would provide validated data would involve substantial financial investment and, arguably, would need some measure of legislative change. The latter could probably be achieved by relatively minor amendments or additions to the *Environmental Protection Act 1990* to extend the requirements under Section 79 to include a requirement to assess issues identified as being "nuisances" which do not fall within the strict definitions of "statutory nuisance" and, if a problem were identified, to monitor in the appropriate fashion. Such issues should include pollution from road traffic. Financial issues would clearly need a firm commitment from Central Government to enable any such monitoring to be carried out in a manner consistent with the national networks. Various publications from Central Government, most notably the consultation paper mentioned above, have *stated* that there is such a commitment; maybe now is the time to *prove* that commitment.

Is local authority air pollution monitoring a necessary function? It is surely an essential function.

The views expressed in this paper are those of the author and do not necessarily reflect the policies of Bristol City Council.

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PLANNING AND POLLUTION CONTROL:

A EUROPEAN DIMENSION

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1. Introduction

The closure in 1992 of the Coke Works at Monkton near Newcastle, although welcomed by local residents who had campaigned for many years against the nuisance and harm to public health attributed to its emissions of smoke and sulphur dioxide, received little attention beyond the immediate locality. Given the decline of the heavy industrial sector of the UK economy, such closures have become commonplace, especially in the North-east of England.

However in the last six years of the plant's operation, a proposal, related to energy recovery from the products of the carbonisation process, raised a number of issues, concerned with the effect of European Community law on the regulation of sources of industrial air pollution, which could prove of wider relevance. The aim of this paper is to summarise, for those engaged in the control of air pollution, the findings of a research study presented in greater detail elsewhere.(1)

2. The Turbine Proposal

The original bank of 33 coke ovens at the Monkton Works was built in 1937. A second bank was added in 1955 and, following replacement by a second generation of ovens in 1972 and 1981, the plant's maximum annual throughput of coal exceeded half a million tonnes. In each working day, approximately 445,000 m^3 of combustible 'coke oven gas' was generated and, if not immediately utilised as a fuel on or off the site, this gas had to be burnt at a 'flare stack'. Of the resulting discharges to atmosphere, the most important for our discussion is the sulphur dioxide arising from the sulphide impurities in the coal.

One effect of the *Energy Act 1983* was to end the virtual monopoly of the Central Electricity Generating Board (CEGB) in the supply of electrical power to the area electricity boards. This change and the award of a capital grant by the European Commission under its '1986 Energy Demonstration Projects' scheme were sufficient incentive to prompt National Smokeless Fuels (NSF) to consider installing a gas turbine, fuelled by its coke oven gas and capable of generating 3.6 MW of electricity, at its Monkton Works. With 70% of this output used on site and the remainder sold, at the nationally agreed tariff, to the North Eastern Electricity Board, annual saving of c. £700,000 were possible

It should be noted that the proposal involved no change in the total emission of sulphur dioxide from the works; this would continue to depend simply on the throughput and the sulphur content of coal. But if the turbine were to be operated as planned, two environmental benefits would follow:

a) some SO_2 which would otherwise have been discharged from the 30m flare stack would now be emitted from a new stack serving the turbine and being taller (55m), this would afford a small reduction in *concentrations* in the vicinity of the works;

b) the 3.6 MW generated from this source would allow a commensurate reduction in output (and hence in emissions of SO_2 and other pollutants) elsewhere in the CEGB network of coal-fired stations (especially Blyth in Northumberland).

3. Planning Inquiry 1

South Tyneside MBC refused planning consent for NSF's proposed turbine and the associated stack. At the local inquiry convened to hear the ensuing appeal, the local planning authority agreed that it would offer a small decrease in local concentrations; but they disputed NSF's claim that their scheme entailed a small reduction in overall sulphur emissions. In terms of SO_2 discharged per MW generated, the proposed turbine (4.8 gm/sec/MW) compared unfavourably with a typical 2000 MW coal fired CEGB station (2.6 gm/sec/MW) and worse still if such a station were fitted with flue-gas desulphurisation (0.26 gm/sec/MW). However, if dusulphurisation plant were to be installed *after* the coke ovens and *before* the turbine, then major reductions in overall emissions (and hence significantly lower local concentrations) of SO_2 could be achieved, thereby making discussion of sulphur substitution rates irrelevant. A proposal to this effect was included among the planning conditions which South Tyneside urged the Secretary of State to apply if he were eventually minded to uphold the appeal.

Table 1: Sulphur Emission/Power Output Ratios

	(Units: gm/sec/MWe)
Monkton Turbine	4.8
Modern 2000 MW coal-fired station:	
without flue gas desulphurisation	2.6
with flue gas desulphurisation	0.3

The planning authority's aim was to tie planning consent for the turbine and its chimney to a binding commitment to remove sulphur from its fuel (i.e the coke oven gas). An awareness of the existence on the site of tower purifiers which had been used in the past to remove sulphur (mostly in the form of hydrogen sulphide) from the coke oven gas was one of the motivations of this strategy. Another was the knowledge that 90% sulphur removal constituted one of the published requirements of 'best practicable means' for cokeworks. With regard to the Monkton works in particular, Her Majesty's Inspectorate of Pollution (HMIP) had written as recently 13 January 1987:

> 'the present burden of sulphur dioxide dispersed to atmosphere from this flare is unacceptable and in order to comply with best practicable means only purified gas can be disposed of in this way. Flare stacks are intended for emergency relief and not for continuously destroying unpurified gas.'(2)

The council justified its aim of securing a significant reduction in sulphur emissions from the existing works by reference to the effects of acid deposition on the wider environment and in terms of various international protocols and commitments, such as that of the so-called '30% Club' (i.e. the signatories to the Helsinki protocol of the UNECE Convention on Long-range Transboundary Air Pollution). The council's expert witness further argued that although, at 540 tonnes per annum, the sulphur dioxide emitted from Monkton constituted less than 0.016% of total UK emissions, its relative importance would increase as emissions from other sources, especially those from large coal fired power stations about to be equipped with flue gas desulphurisation plant, began to fall. Allowing a new power plant, albeit only 3.6 MW, to come on stream without taking the opportunity to reduce its output of sulphur would be deprecated by Scandinavian governments.

The Inspector accepted the appellant's contentions that the proposal would entail no change in the amount of sulphur dioxide emitted, that discharge via a taller stack could offer a marginal reduction in local SO_2 concentrations and that the proposal utilised a source of energy which would otherwise be wasted. These considerations were nevertheless outweighed by those which persuaded him to dismiss the appeal:

> '. . .now that the decision has been taken to fit 3 existing power stations and all new coal fired power stations with desulphurisation equipment, it is possible to look forward to electricity generation with a reducing output of [SO_2 per MW] of generated power. Although the proposed generating station would not be using coal as its immediate energy source, it is so closely related to coal consumption via the coking process that I think it must be considered in the same category as a coal fired power station. In my opinion it would be undesirable to permit this new generating station, small as it would be in comparison with CEGB stations, because of its relatively high output of sulphur dioxide per unit of electricity production.'(3)

4. Referral To The High Court

Aggrieved at the decision of the Secretary of State to accept his Inspector's recommendation to dismiss the appeal, NSF applied (under s.245 of the *Town and Country Planning Act 1971*) to the High Court to reverse the decision on the grounds that the Secretary of State and, earlier, South Tyneside MBC had acted *ultra vires*. The five detailed grounds cited were concerned, in different ways, with the propriety of determining the planning consent by reference to the level of emissions of sulphur dioxide from the proposed turbine. Of the five, the second:

> 'There was no evidence before the [SoS] or his Inspector that the decision to install desulphurisation equipment at three existing and all new CEGB coal fired power stations was a policy which was intended to and did apply to or have necessary implication for power generating plant of the type and scale proposed.'(4)

merits most attention, for it was on this point that, in an out-of-court settlement, Counsel for the Secretary of State conceded that he had misinformed himself. On 15 February 1989 Mr Justice Rose therefore duly quashed the decision of 20 June 1988 and awarded costs to the applicant. Since the point was never debated in open court, we can only speculate on the Secretary of State's response to NSF's fifth and final claim that 'the feasibility and desirability of achieving compliance with hitherto unannounced policy on emission control' were immaterial and lay outside the scope of the 1971 Act. However all the issues were to be aired again at the re-opened local inquiry.

5. Planning Inquiry 2

Some nine months before the second inquiry began, the Secretary of State had indicated, in a letter to all the parties, the four matters which he considered relevant to the re-determination of the appeal; of these, the following is of most interest:

> 'Any material changes in circumstances which may have arisen since the original decision was issued, whether or not it pertains to the [other three points].'(5)

One of the effects of the *Single European Act* (signed by the foreign ministers of the member states in Luxembourg in February 1986) was the amendment of the 1957 *Treaty of Rome* so as to place the environmental legislation of the European Community on an explicit and unequivocal footing. Article 130R(1) extends the aims of the Treaty so as to include the need to preserve, protect and improve the quality of the environment; contribute towards protecting human health and ensure prudent and rational utilisation of natural resources. These objectives are to be achieved in accordance with certain principles which have emerged from the five Community Action Programmes on the Environment since 1973; these include the 'polluter pays principle' and priority being given to the prevention of pollution at its source. Under Article 5 of the Treaty, a member state has not only to take all measures to assist fulfilment of the Treaty's objectives but also to desist from any measures inimical to their attainment. The Treaty became part of UK law as a result of the *European Communities Act 1972.* It followed therefore that, when advising the Secretary of State, the Planning Inspector must not simply note the obligations of EC law but also apply them in his function as an arm of the state.

The above encapsulates the attempt by Counsel for the Residents' Action Group (RAG) to secure his client's interests by invoking the doctrine of the supremacy of EC over domestic legislation. The detail was related to the EC Directive on air pollution from industrial sources(6) This directive is often referred to as a 'Framework Directive' since it sets out the broad aims (viz. major reductions in atmospheric emissions) to be met by a wide range of industrial sources. It is anticipated that the detailed requirements on, for instance, emission limits for particular pollutants to be observed by a particular industrial sector will be set out in a number of 'daughter' directives. Of the daughters so far conceived, Directive 88/609/EEC on large combustion plant(7) is of passing interest but not of immediate relevance since both coke ovens and gas turbines are excluded from its provisions. Nevertheless, the parent or framework directive (84/360/EEC) has, since 30 June 1987 when 'the laws, regulations and administrative provisions' necessary for compliance should have been enacted, imposed certain obligations on the Secretary of State and members of his department when exercising their discretionary powers (including planning powers) over sites like Monkton. Moreover, Annex I of the Framework Directive lists 'Coke ovens' among the categories of plant covered; and Annex II cites sulphur dioxide as well as dust and other sulphur compounds among the emissions to be considered in any authorisation.

The addition of a turbine and ancillary equipment amounted to a 'substantial alteration' of the Monkton plant; therefore under Article 3(2) this alteration of an existing installation required prior authorisation. Any authorisation which did not entail prevention or reduction of SO_2 (or dust) would ignore the primary purpose of the directive and would therefore be unlawful. Since Article 4 is central to an understanding of RAG's submission, it is reproduced below.

> 'Without prejudice to the requirements laid down by national and Community provisions with a purpose other than that of this Directive, an authorisation may be issued only when the competent authority is satisfied that:
>
> 1. all appropriate preventive measures against air pollution have been taken, including the application of the best available technology, provided that the application of such measures does not entail excessive costs;
> 2. the use of the plant will not cause significant air pollution particularly from the emission of substances referred to in Annex II;
> 3. none of the emission limit values applicable will be exceeded;
> 4. all the air quality limit values applicable will be taken into account.'(8)

According to RAG's Counsel, the substantive criteria of Article 4 referred to the whole plant not simply to the alterations which would trigger such an authorisation. The Inspector was further advised that the wording dictates that the competent authority must withhold an authorisation until the applicant had demonstrated that 'all preventive measures' had been taken and that 'significant air pollution' would not be caused. The existence on the site of the tower purifiers and the recognised availability of other desulphurisation plant meant that NSF would be hard pressed to claim that 'all. . .measures' had been taken. If they invoked the 'not entailing excessive costs' caveat, it should be understood that, if costs were adjudged to be excessive, this would be due to NSF's improvidence in allowing the water cooling towers to fall into disuse. With regard to Article 4(2) the past record of the plant in regard to pollution from dust and smoke as well as SO_2 was only too notorious.

In summary, Counsel for the Residents argued that EC law and principle demanded that the appeal be dismissed as the proposal failed to address the issue of preventing or reducing air pollution in line with the aims of Directive 84/360/EEC, notwithstanding the views of HMIP. But were consent to be granted, substantial pollution reduction measures, especially desulphurisation of the coke oven gas, should be incorporated as planning conditions.

The recommendations of the Inspector, which were endorsed by his Assessor, can be stated very briefly. He recommended that consent for the proposed chimney be given subject to the standard conditions on timing plus a condition requiring the fitting of suitable equipment to desulphurise the coke oven gas. The relevance of RAG's lengthy submission on the application of EC environmental legislation was referred to the Secretary of State for his consideration. The decision of the Secretary of State can be stated with equal brevity: he allowed the appeal and granted planning consent for the 55m chimney subject only to the condition that building commence within five years.

6. Conclusions

The question of overlapping jurisdictions has been discussed(9) well before the Monkton turbine was ever envisaged. The present case means that the pros and cons of the 'single track' approach to controls over air pollution from industrial sources cannot now be debated without some reference to the extent to which UK practice adheres to the letter and spirit of relevant EC legislation. Two grounds can be found in support of this assertion.

The framework directive (84/360/EEC) on industrial air pollution is intended to be comprehensive in its scope (eventually having a large number of daughter directives detailing timetables for emission reduction by sources of specific pollutants). Full implementation of its provisions will therefore not be achieved rapidly, even by those member states most supportive of its aims. Secondly, one authoritative commentator(10) has cited 84/360/EEC as meeting the two criteria – it is precise and it is not conditional upon additional measures – which the emerging European Community case law would suggest, must be satisfied if a directive is to be, in prinicple, capable of direct effect.

As the preceding narrative makes clear, the residents' and the planning authority's legal challenge was made in earnest and was not merely a gesture. It was made at the instigation of lawyers who were familiar with the relevant European case laws and who were prepared, had it not been for the closure of the plant, to pursue the matter in the Court of Appeal and the European Court. The lessons of Monkton will not be lost on other environmental action groups, especially those receiving advice from the growing band of lawyers with a personal commitment to 'green' issues. Arguing for a direct adherence by any emanation of the UK state to EC law could become a familiar tactic employed at planning inquiries. The Monkton case may yet prove to be a landmark.

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TRENDS IN RURAL AND URBAN NO_2 DIFFUSION TUBE MONITORING ACROSS LEICESTERSHIRE

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The Research Fund of the NSCA has supported an investigation into the distribution of nitrogen dioxide across Leicestershire for four out of the past five years, 1989-91 and 1992. Final year project students of the Science and the Environment degree at the De Montfort University Leicester have incorporated a nitrogen dioxide diffusion tube study into an investigation of acid deposition across Leicestershire. Whereas the acid deposition study was for the two months of mid November-December-January in each year the nitrogen dioxide study covered the second weeks of December and January in each year. Twenty-five diffusion tubes were set out for each week, distributed across an urban and rural grid. The diffusion tubes were obtained from, and analysed by, Gradko International, Winchester at a cost of £7 inclusive of supply and analysis. Duplicate and triplicate analyses of tube exposure for the same time at the same sites were good. The total cost over four years was £2200.

Bearing in mind the controversy concerning the siting of nitrogen dioxide diffusion tubes, we have sought 'background' type sites in the sense of these being away from major roads and industrial sources. The averaged results for these two winter weeks results for urban and rural results will obviously be subject to annual/monthly variations, Table 1. After correction for the different concentration units used, the results are broadly similar to those observed for the Glasgow area nitrogen dioxide diffusion tube study in 1986. What is different in the spread of sites across Leicester is the inclusion of relatively isolated rural sites across Leicestershire such as Rutland Water and Twycross.

Table 1:

r	NO_2 Concentration ($\mu g\ m^{-3}$)	
	Urban	Rural
1989	19.9	11.5
1990	19.6	14.4
1991	21.0	19.7
1993	41.4	33.9

Both the urban and rural site averages follow the same overall increasing pattern, Fig. 1. The difference between the averaged urban and rural sets of nitrogen dioxide values is 50% at most (1989) and are much closer in more recent years (1990-91, 1992). The evidence is that whilst urban background values for atmospheric nitrogen dioxide are higher than rural values, the difference between them is not large. Whilst the concentration of atmospheric nitrogen dioxide for the two winter weeks studied has risen, the associated study of pH for rainfall across Leicestershire for November/Decmber/January for 1989-92 is gently rising, i.e. less acid deposition. This reflects the greater decrease in sulphur dioxide deposition in the area. The results are given as $\mu g\ m^{-3}$ and are not corrected with a 'standard' factor to be 'consistent' with chemiluminescent 1 hour mean values.

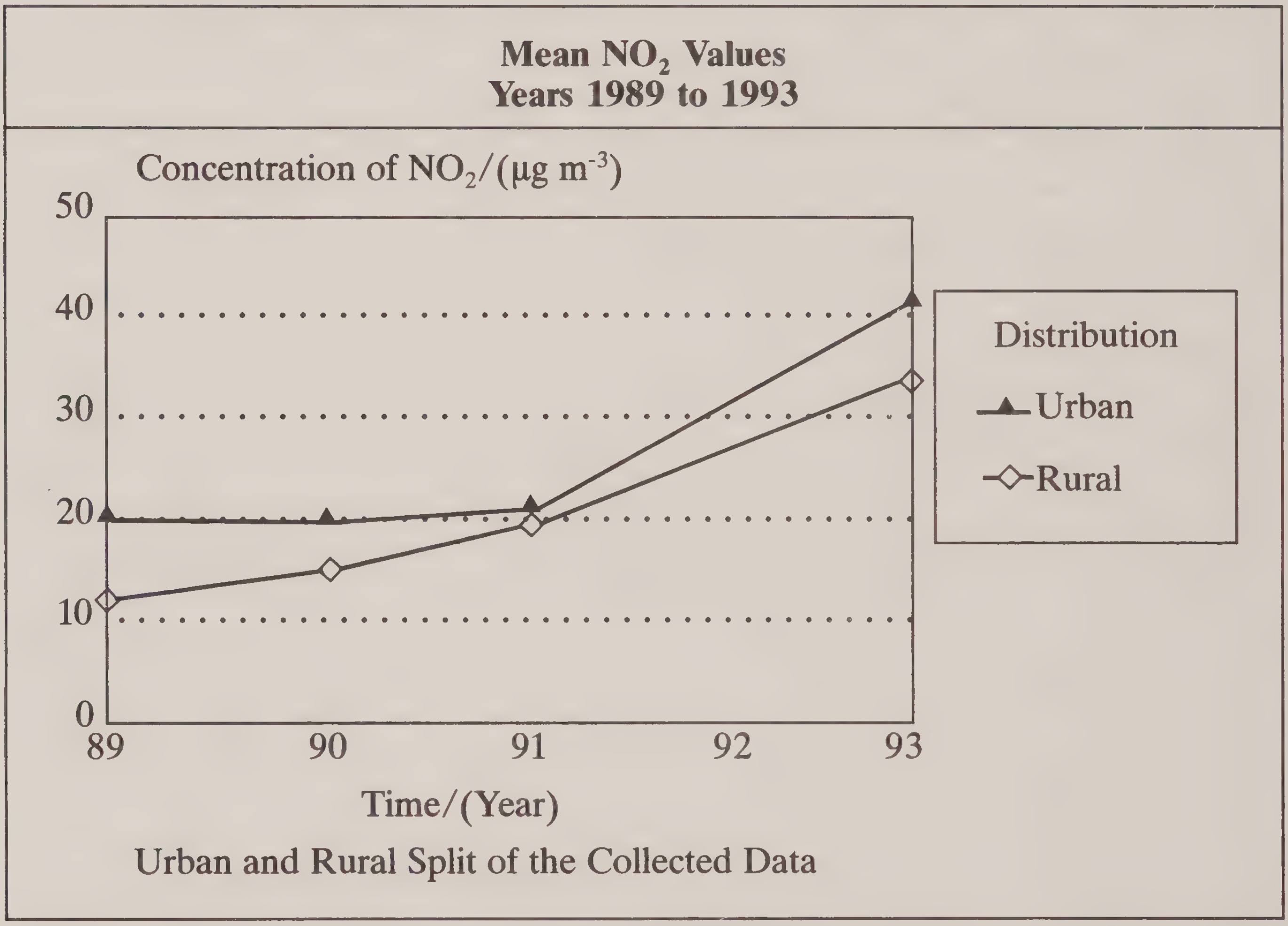

Figure 1 Yearly Averages of NO_2, Weeks 49 and 02, Urban and Rural

It is surprising to find that 'background' urban and rural site nitrogen dioxide values are so close; it would normally be expected that urban values would be considerably higher. This expectation almost certainly arises from the site monitoring strategy for atmospheric nitrogen dioxides which is based upon that for sulphur dioxide. This is probably misleading, for whilst sulphur and nitrogen dioxides are the principal acid gas components in the atmosphere, there are considerable differences between both their emission source distributions and their atmospheric chemistry. The differences in chemistry are readily shown by their estimated atmospheric residence times. Harrison[1] quotes the nitric oxide/nitrogen dioxide system as having an atmospheric residence time of one day, against ten days for sulphur dioxide. Nitrogen dioxide is more reactive by an approximate order of magnitude than sulphur dioxide and will thus be removed from the atmosphere more rapidly after emission. Transport mechanisms will be less important for nitrogen dioxide than for sulphur dioxide because the former reacts more rapidly, closer to their emission source. It follows that atmospheric nitrogen dioxide values will be considerably more site specific than for sulphur dioxide close to major emission sources, such as a major road. Therefore, much greater care is required in the selection of nitrogen dioxide monitoring sites; the characteristics of monitoring sites must be reported in detail for comparative statements to be made from results obtained. For example, the 1986 Glasgow study[2] of nitrogen dioxide clearly differentiated between certain sites due to their proximity to major roads.

The source distributions of nitrogen oxides are also different from sulphur dioxide. Sources of the former are roughly half from fixed heating sources, half from (mobile) internal combustion engines whilst sources of sulphur dioxide are almost entirely fixed, other than diesel vehicles. Little is known of the detailed variation in spatial distribution across rural and urban areas and also within urban areas of nitrogen dioxide relative to road networks. As its concentrations rise towards the EC Air Quality Standard, further work is needed on the spatial and temporal distributions of nitrogen dioxides in both urban and rural areas.

Monitoring the atmospheric site concentration of any substance will only give a partial view. Taken together, different reactivities and source distributions for separate gases will give different ‘pictures’ from monitoring of their respective local concentrations. Thus, Smoke Control Areas are a method of controlling sulphur dioxide emissions from multiple point sources in urban and industrial areas such as domestic coal fires, factory boilers, etc, with diesel engines being the only other, minor, source. Monitoring by the National Survey method is appropriate to this multiple, diffuse source, slow reacting pollutant gas.

Measurement of nitrogen dioxide in a traffic-free city centre precinct by chemiluminescence will give a different pattern and average level than weekly diffusion tubes fixed to lamp posts at an inner city major road junction. Whilst both sets of concentration values are internally consistent, they are only peripherally connected. The EC Air Quality Directive gives imprecise and vague instructions as to monitoring site location and cannot unify these two cases. It is clear that the controversy over atmospheric nitrogen dioxide concentrations will continue until the site monitoring requirements are specified in much greater detail than exists at present.

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RECENT DEVELOPMENTS IN AIRBORNE DUST MONITORING

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Abstract

Many ambient pollutants are in particulate form and there is a need to sample them for a variety of reasons. A wide range of samplers is available for different purposes but, unfortunately, there does not seem to be a very good understanding of the reasons governing the choice of samplers for different tasks. The present paper attempts to address some of these problems by reviewing briefly the types of sampler used for collecting airborne dust in the ambient atmosphere and the reasons for their choice. Special attention is given to sampler performance and to wind effects on performance, since this is one of the main features of the atmosphere affecting sampler behaviour. Some recent developments in sampler design are discussed. A shorter version of this paper was originally presented as a lecture by the first author to the Investigation of Air Pollution Standing Conference in June 1992, following which it was extended and adapted by the second author for use as lecture notes to an MSc course on Integrated Pollution Control. In view of the great interest that has been shown in this subject, it was felt that the work merited a wider audience and it has been extended again to form the present paper.

1. Background

The sampling of particles in the ambient atmosphere (not including measurements in chimney stacks and exhaust ducts) is carried out for two main reasons:

a) to determine levels of airborne dust for correlation with respiratory health effects and to ensure that they are below health-derived limits;

b) to determine levels of deposited dust to the ground or to other surfaces. This may be for health reasons, deposited material such as heavy metals or dioxins may be ingested through secondary pathways, or for correlation with perceived nuisance and loss of amenity. Deposited dust is one of the two major causes of complaint about air pollution (alongside odours), since its effects can be directly perceived.

A great variety of samplers has been developed and used for both reasons in the UK and elsewhere. The reasons for their development, their effectiveness and manner of use are not always clear. This paper provides a brief explanation, paying special attention to sampler performance. One of the main parameters affecting ambient sampler performance is windspeed and there is no practical control over this. Thus it is important that ambient samplers should have a largely windspeed-independent performance, at least within the size range of particles they are intended to sample. Often they do not.

References to particle sizes in this paper are to the particle aerodynamic diameters.

Besides the present paper, a recent review of monitoring of radioactive particles by Nicholson and Garland (1991) may be useful, and Vincent's (1989) recent book on aerosol sampling covers many related areas of interest.

2. Previous Studies of Airborne Dust

Though measurements of deposited dust were amongst the first studies of air pollution, around the beginning of the century (Brimblecombe, 1987), airborne dust measurements generally have been of limited extent compared with those of other pollutants. The major dust monitoring activities of recent years are outlined below.

As a result of the large number of deaths in the early 1950s from bronchitis caused by inhalation of smoke and sulphur dioxide during the smog episodes, a countrywide network of simple samplers was set up in the 1960s to measure the levels of black smoke in the atmosphere. The sampler used, shown in Figure 1, comprised a downward-facing funnel into which air was drawn, with the sampled airborne particles collected on a paper filter at some distance (typically 2m) from the inlet. The quantity of dust was assessed by means of light obscuration, with the black particles prevalent in smoke from fossil fuels contributing most to the measurement. This was adopted by the British Standards Institute as the standard method for measuring black smoke (BSI 1969a). It is still in operation and its use is now additionally covered by an EC directive (80/779/EEC). Its performance, also shown in Figure 1, was measured by McFarland (1982) (in the USA, after 20 years of use in the UK), when it was found to collect particles below about 4 µm very well, but for larger particles its collection performance was poor. For the measurement of black smoke this was satisfactory. The initial size distribution of smoke particles is very fine and, though these can agglomerate in the atmosphere into quite large particles at times, their aerodynamic diameter remains small. However, for other, larger particles or for particles of different colour, it is not a very satisfactory method.

In the early 1970s, the government instigated two national surveys of ambient dust levels to investigate the health effects of ambient particles. In the main survey, levels of sulphate particles were determined, whilst in the other a limited survey of metal particles was carried out in order to identify regions of high concentration of these pollutants. The samplers used in both surveys were very similar, as can be seen in Figure 2. They each comprised a downwards-facing cylindrical hood covering either eight inverted 25 mm open-faced filter holders in the sulphate sampler (called the S-type sampler) or a single 37 mm open-face filter holder in the metal sampler (called the M-type sampler). The design, incorporating a cylindrical hood and downwards-facing filter holders, was influenced by the need to protect the collected sample from rain, wind and birds. However, this hood affected the sampling characteristics. In very light winds large particles were not sampled due to elutriation in the vertical flow into the sampler. Also, the sampler showed a strong sensitivity to wind effects generally. Upton and Barrett (1985) investigated its sensitivity to wind effects in a wind tunnel and their main results are given in Figure 3, which shows its particle collection efficiency as a function of windspeed and particle size. It is an effective sampler for small particles, below about 10-15 µm diameter, but above these sizes its performance is erratic and falls off markedly with increasing windspeed. The 'M' type sampler, with a single filter holder, was also adopted for sampling for the EC Lead Directive (82/884/EEC) along with a number of other particle samplers used in different European countries. Whilst bearing some resemblance to health-related dust fractions such as the thoracic and the respirable (which are discussed below), this sort of performance does not agree very well with either, so these samplers cannot be considered suitable for measuring health-related dust fractions in the ambient atmosphere. Also, unless the particle size range of interest is in the smaller fractions, where it will all be collected, this sort of wind-dependent sampling behaviour is generally unsatisfactory.

In the cases of sulphate, lead and the heavy metals, for which the 'M' and 'S' type samplers were originally designed, it was presumed that the bulk of the sample was in the fine particulate fraction, which was all collected. However, this is not entirely certain as, though the sources of these materials are mostly fine particulate, the proportion attached to larger particles (that of lead onto road dust, for example) is generally less certain. The performance of most of the other samplers used for the lead directive was investigated at the same time (Barrett et al 1985); they all showed a variable, wind-affected performance.

The measurement of deposited dust was also the subject of a countrywide national survey from the 1960s to 1980. This was instigated to provide information on average levels at different locations so that cases of nuisance caused by dust have a framework for assessment. The instrument used was the British Standard Dust Deposit Gauge (BS 1747 Pt 1). It is a passive device (shown in Figure 4), little changed since its first use nearly a hundred years ago (Brimblecombe, 1983). It is essentially a large bowl with its opening facing upward, with a bird guard and a collecting bottle, fixed to a stand so that the horizontal gauge opening is about 1.5 m from the ground. This gauge remains the current British Standard. Again, it was only after considerable use had been made of the BS gauge that investigations of the sampling performance were carried out, at Warren Spring Laboratory, by Ralph and Barrett (1984). Some of these results are presented in Figure 5, showing that collection efficiency was very dependent upon windspeed and particle size. The collection efficiency was especially poor for the particle sizes likely to travel any distance in the wind (below 200 μm) and windspeeds above 2-3 ms^{-1}. This performance is doubly poor when it is remembered that the levels of wind blown dust increase markedly with increasing windspeed.

A later device for monitoring windborne dust — the British Standard Directional Gauge (BSI, 1972) — uses four flux gauges set at orientations of 90° in order to determine the source direction of the dust as well as the flux. The flux of dust is the passage of dust horizontally past the sampling station. A diagram of the Directional Gauge is shown in Figure 6. Each flux gauge is a cylindrical tube with a vertical opening intending to collect the horizontal flux of particles past a measuring station. This gauge may be used to assess the source strength of windblown dust and its depletion rate with distance away from the source. Despite this being a relatively recent development (Lucas and Moore, 1964) investigations of its performance were not reported until the 1980s (Ralph and Hall, 1989). The results, given in Figure 7, show a low collection efficiency that is strongly dependent upon both windspeed and particle size. Though it does not give a very reliable measure of flux, the gauge does have quite good directional properties so it can be used effectively to determine dust sources.

This very brief summary of the equipment commercially available and presently used in the UK for monitoring dust in the ambient atmosphere, does not fill one with confidence as to the validity and reliability of many of the measurements made. However, considerable progress has been made in recent years, both in the criteria for sampling and in actual sampler developments to enable us to look ahead with more confidence. The remainder of this paper will present some of the more recent developments in sampling technology for dust in the ambient atmosphere. Unfortunately not all of the developments are currently commercially available.

3. Health-Related Dust Sampling

3.1 New Health-Related Sampling Conventions For Airborne Dusts

For health effects that are suspected to have arisen from particles that have entered the body through the nose and mouth during breathing, one must have a sampler whose performance mimics the efficiency with which particles enter the nose and mouth and which may then penetrate to the region in the body for which harmful effects occur. Workers in the occupational hygiene field have realised this for some years and have defined the different fractions of those particles that penetrate to the different regions.

Since the early 1980s an ad-hoc working group of the International Standards Organisation has been formulating health-related sampling conventions for airborne dusts both in the ambient atmosphere and in the workplace. The final agreed conventions have passed through most stages of the approval procedure and should soon become international standards (ISO CD7708). They are defined in Figure 8 and comprise three main fractions:

a) the INHALABLE fraction, defined as the mass fraction of total airborne particles which is inhaled through the nose and mouth;

b) the THORACIC fraction, defined as the mass fraction of inhaled particles penetrating beyond the larynx;

c) the RESPIRABLE fraction, defined as the mass fraction of inhaled particles which penetrates to the unciliated airways (the alveolar region).

These conventions provide target specifications for the design of health-related sampling instruments, and give a scientific framework for the measurement of airborne dust for correlation with health effects. For example, the inhalable fraction applies to toxic pollutants which are only required to enter the body and dissolve, while the respirable fraction which penetrates to the alveolar region of the lung can cause diseases such as pneumoconiosis, silicosis, asbestosis, etc. This philosophy has not until quite recently been taken on board by the environmental community.

3.2 Ambient Samplers Designed to Meet Health-Related Sampling Conventions

3.2.1 PM10 Samplers

During the early 1980s, the US Environmental Protection Agency stated that for ambient airborne dust levels, a thoracic dust fraction known as the PM10 should be used as the sampling convention. This convention, shown in Figure 9, is close to the ISO thoracic convention with 50% collection at 10 μm, although there are differences (the thoracic convention requires a greater collection of larger particles up to 25 μm). High standards of collection performance are required of these samplers, including independence of windspeed, and there is a demanding test protocol for determining this (EPA, 1987). Following this decree a number of researchers in the US developed 'PM10' samplers, two of which are shown in Figure 10. They both comprise an omnidirectional, rain-protected entry followed by a size-selective stage with PM10 dust collected on a filter. The Andersen 321A is a self-contained device based on the earlier hi-volume sampler with a flow rate of 1200l min^{-1}, whilst the EPA Dichotomous Sampler is used both in a self-contained sampler and as the inlet to other designs using instantaneous mass monitors. The performances of the two samplers, measured by Hall et al (1988), are given in Figure 11. It can be seen that they both agree very closely with the PM10 sampling convention. These and other similar samplers are now used routinely in the USA for measuring ambient dust levels. A recent development has been the use of a Tapered Element Oscillating Microbalance (TEOM) following the size-selective inlet instead of dust collecting filter. This is capable of measuring the small variations in the collected mass of dust with time.

3.2.2. Developments in Europe

Researchers in Germany and The Netherlands, following closely the developments in the USA, obtained EC funding to make measurements of ambient dust levels with PM10 samplers in European conditions. At the same time DG XI of the Commission provided a small amount of funding to the Institute of Occupational Medicine to develop a European Reference Sampler that first sampled the inhalable fraction and then further selected the thoracic fraction of the inhaled particles. The final prototype version (Mark et al, 1990) is shown in Figure 12. It was found that reliable measurements of both inhalable and thoracic particles could not be obtained with one sampling head, rather it was necessary to use two heads – one for the inhalable dust and one which uses a combination of inhalable entry and thoracic size selector for thoracic dust. The performances of the two sampling heads obtained during the development are given in Figure 13, from which it can be seen that they agreed reasonably well with the inhalable and thoracic conventions. However, in subsequent wind tunnel tests at Warren Spring Laboratory (Hall et al, 1990), both sampling heads showed excessive internal wall losses when using relatively soft solid test aerosols and liquids. These losses were not observed in the original work which used gritty alumina test particles which bounced well. In addition, field experiments carried out in The Netherlands showed good performance for the inhalable sampler, and over-sampling for the thoracic sampling head.

As a consequence of this work, the EC decided in 1991 that the IOM sampler was not sufficiently well-developed to become the European Reference Sampler and so chose the PM10 convention as the reference for the thoracic fraction in its revision of the European Directive (80/779/EEC) for SO_2 and Suspended Particles. The other main reason for this decision was that fully-tested samplers for PM10 dust are available from the USA. The EC is currently devising a test protocol based on field-only comparisons for testing the performance of new PM10 samplers.

Further developmen of the inhalable sampling head
described above has lar ems (Upton et al (1992). The
problems of avoiding wa articles are fundamental to any
sampler of this sort and by fitting the sampler with an
internal cassette, in whic l, wall losses became irrelevant
and it now satisfies the i t is currently the only ambient
sampler design which dc t yet available commercially.

4. Deposited Dust Me

4.1 Background

Deposition of particles t of two ways, depending upon
whether the particles are y between 'large' and 'small' is
around 10-20 μm.

Large particles are p ike other forms of precipitation
and the rate of depositio the airborne concentration, χ,
and the particle gravitat

The deposition of la red by passive dust deposition
gauges, like the British described earlier.

Small particles are variety of processes, by falling
under gravity, by trappi roughness (grass, for example)
and by diffusion to the defined in the same way as for
large particles, but the n effective deposition velocity
which takes account of t tive deposition velocity of small
particles is always high ling speeds. Typical values of
deposition velocity in m cm s^{-1}. The deposition of small
particles is estimated b oncentration and assuming an
effective deposition vel al measurements.

The flux of particles, F, blown by the wind past a point, needs brief consideration as it is not directly related to deposition. It is defined as the product of the airborne particle concentration, χ, and the windspeed, V. That is,

$$F = \chi V.$$

Flux can be related to deposition only if the relationship between particle size (and therefore falling speed), windspeed and airborne concentration is known. This is never known. The measurements of particle flux using a flux gauge of the sort described earlier serve a special purpose and usually need to be made in combination with measurements of deposition.

4.2 Ambient Dust Concentration Measurements for Small Particle Deposition

There are no samplers designed especially for this purpose. If a certain size range of particles is of interest then a sampler can be selected from the sort that have previously

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CORRECTION - Clean Air, Winter 1993

Page 198: the equations should read:

$$D = \chi V_s.$$

$$F = \chi V.$$

been described for health related or other sampling. Thus, for example, a PM10 sampler would provide measurements of the particle size range (below 20 µm) to which the small particle deposition criteria apply. If a sample is required of the whole of the ambient particle size distribution for deposition estimates, then larger particles must be collected as well. There is no formal definition of this particle size range. There is an EC limit concentration for Total Suspended Particulate but it is not defined effectively. Nor is there a sampler specifically designed to collect this size fraction other than the WRAC (the Wide Range Aerosol Classifier), a large, expensive and specialised device of which there are three known examples and whose collection performance is uncertain. The samplers closest to obtaining the total atmospheric particulate mass are the US Hi-Volume sampler (Wedding, 1977), which has variable collection characteristics and an upper size cut-off around 50 µm, or the sampler for the inhalable criterion (the only present example of which is described above), which has a defined collection characteristic and will sample particles beyond 100 µm in a controlled way.

4.3 Dust Deposit Gauges for Direct Measurement of Particle Deposition

The poor performance of the British Standard Gauge and its relatively high cost led researchers at Warren Spring Laboratory to look for a better, cheaper design. They identified two main reasons for the poor performance of the BS and other similar gauges. Firstly, aerodynamic blockage caused by the substantial bulk of the collecting bowl caused a rising and accelerating airstream over the gauge. Particles descending under gravity in the wind, which would be expected to enter the gauge, tend to be displaced away from the opening, thus reducing the catch. Secondly, a circulating flow was driven inside the gauge by the wind which can remove particles already collected.

In their search for a collector with low aerodynamic blockage, the performance of an inverted frisbee was investigated by Hall and Waters (1986) and by Hall and Upton (1988). They found that, provided that the collection surface was made sticky, a considerable improvement over the BS gauge was achieved, as shown in Figure 14. Whilst the performance of the plastic frisbee showed promise and it was very cheap, it was not suitable (due to warping and splitting) for sampling trials lasting longer than a few days. A new metal gauge was therefore produced which retained the low aerodynamic blockage of the frisbee, whilst incorporating a shallow curvature to improve drainage of rainwater. It is shown in Figure 15, both the collecting bowl and a complete version of the gauge are commercially available.

Field experiments showed variable differences in the collected mass between the frisbee gauges and the BS gauges. This seemed to be due to different causes of particle loss between the two types of gauge. It was thought that the BS gauge had poor collection but better retention than the frisbee type, where loss of collected particles, probably due to the splashing of raindrops removing particles from the surface, seemed to be higher. Using a sticky gauge surface greatly reduced losses, but there were practical problems in recovering the sample. Further investigations (Hall et al, 1992, Vallack, 1993 and subsequent investigations) showed that the use of a disc of porous polyester foam in the bowl of the gauge to be almost as effective for retention as a sticky surface, to eliminate splashing entirely and to be easier to use in practice. In a more recent development (Hall et al, 1993), a slightly deeper shape has been designed so that

Further development at Warren Spring Laboratory of the inhalable sampling head described above has largely cured its original problems (Upton et al (1992). The problems of avoiding wall losses when sampling large particles are fundamental to any sampler of this sort and difficult to avoid. However, by fitting the sampler with an internal cassette, in which the whole sample is retained, wall losses became irrelevant and it now satisfies the inhalable criterion very well. It is currently the only ambient sampler design which does this. Unfortunately it is not yet available commercially.

4. Deposited Dust Measurements

4.1 Background

Deposition of particles to the ground is found in one of two ways, depending upon whether the particles are large or small. The boundary between 'large' and 'small' is around 10-20 µm.

Large particles are presumed to fall to the ground like other forms of precipitation and the rate of deposition, D, is given by the product of the airborne concentration, χ, and the particle gravitational falling speed v_s. That is,

$$D = \chi v_s.$$

The deposition of large particles is usually measured by passive dust deposition gauges, like the British Standard Dust Deposit Gauge described earlier.

Small particles are deposited on the ground by a variety of processes, by falling under gravity, by trapping or impaction on to surface roughness (grass, for example) and by diffusion to the surface. The deposition rate is defined in the same way as for large particles, but the falling speed is replaced by an effective deposition velocity which takes account of these other processes. The effective deposition velocity of small particles is always higher than their gravitational falling speeds. Typical values of deposition velocity in many practical cases are around 1 cm s^{-1}. The deposition of small particles is estimated by measuring their airborne concentration and assuming an effective deposition velocity derived from experimental measurements.

The flux of particles, F, blown by the wind past a point, needs brief consideration as it is not directly related to deposition. It is defined as the product of the airborne particle concentration, χ, and the windspeed, V. That is,

$$F = \chi V.$$

Flux can be related to deposition only if the relationship between particle size (and therefore falling speed), windspeed and airborne concentration is known. This is never known. The measurements of particle flux using a flux gauge of the sort described earlier serve a special purpose and usually need to be made in combination with measurements of deposition.

4.2 Ambient Dust Concentration Measurements for Small Particle Deposition

There are no samplers designed especially for this purpose. If a certain size range of particles is of interest then a sampler can be selected from the sort that have previously

a foam liner can be better accommodated; this also has a turned-in lip and a flow deflecting ring fitted around the gauge to provide better control over the airflow. A cross section of this design is shown in Figure 16. It has a flat, unaccelerated flow over the gauge opening and it proved impossible to blow out collected dust up to windspeeds of 10 ms^{-1}. It is intended that this should be the basis of a new standard gauge design.

4.4 Flux Gauge Developments

Flux gauges are used to provide a measurement of the horizontal flux of particles passing a given point, and when arranged in four orthogonal directions, as in the BS directional gauge, give an indication of the source of the wind-blown particles. However, as an individual flux gauge the collection efficiency of each of the four tubes in the BS Directional Gauge has been shown to be poor. Two main problems were identified with its performance. Firstly, there is no flow into the closed container of the gauge and so the flow stagnates at the entry and particles enter only by virtue of their inertia. This makes the performance both windspeed and particle size dependent. Secondly, there is a wind-driven circulation inside the gauge which tends to remove collected particles.

Two approaches for developing an improved flux gauge were investigated by Hall et al (1992). In the first approach the effect on performance of various parameters of a closed container type of gauge were investigated. There seemed to be no way of controlling the internal circulation in a gauge with a vertical slot opening. Even a simple forward facing tube with a blanked-off end proved a better collector. A tentative design for a gauge of this sort comprised a number of small cylindrical tubes arranged horizontally together and feeding into a central collection tube. A sketch of this design is given in Figure 17, together with the performance of a single tube at two windspeeds and for two particle sizes. The performance of the BS gauge is also given (the cross-hatched results) and it can be seen that a considerable improvement has been made. A better approach has involved the development of a flux gauge with an airflow through it past some sort of particle trap. A number of different designs were investigated, both to generate the necessary airflow through the gauge and to capture and retain the collected particles. The final design is shown in Figure 18 and full details of it can be found in Hall et al (1993). It uses a wedge shape to provide airflow through the gauge and a piece of porous polyester foam to trap the particles. Its performance in relation to the BS Directional Gauge is also given in Figure 19. It is intended that this also should be the basis of a new standard flux gauge design. It is available commercially.

5. Directional Sampling

An important practical problem that arises with many industrially-generated dust sources is the apportionment of the contribution of different sources to dust levels at a site. This can be done by directional sampling, that is, by sampling with multiple samplers which operate only over fixed arcs of wind direction. This can be done quite simply using two samplers and a wind velocity and direction meter. When the wind velocity is above a given threshold value and from a direction contained within a given arc, then one of the samplers is operational, and when the wind is from all other directions the other sampler is operational. The contribution made by the source under investigation to the dust measured at the sampling station can then be calculated. This can be a very powerful and effective technique for apportioning dust nuisance.

A directional sampling system has been set up for monitoring ambient airborne dust levels using two sampling heads within the hood of the M-type sampler (Barnett et al, 1987), which is available commercially. There is also a design for monitoring deposited dust levels with two frisbee gauges (Clayton et al, 1992) where the gauge not in use is automatically covered. In principle, any sort of sampler can be used in this fashion as long as it can be stopped and started in some way as the wind speed and direction varies.

6. Concluding Remarks

This paper has outlined very briefly the methods used in the UK for monitoring dust in the ambient atmosphere, both in the past and the more recent developments. Past and many present procedures have used instrumentation of doubtful validity and reliability and have not covered very well the types of sampling needed. However, developments have taken place, both in the measurement of health-related dust and in the measurement of "nuisance" dust such that improved, validated equipment should become available within the next few years.

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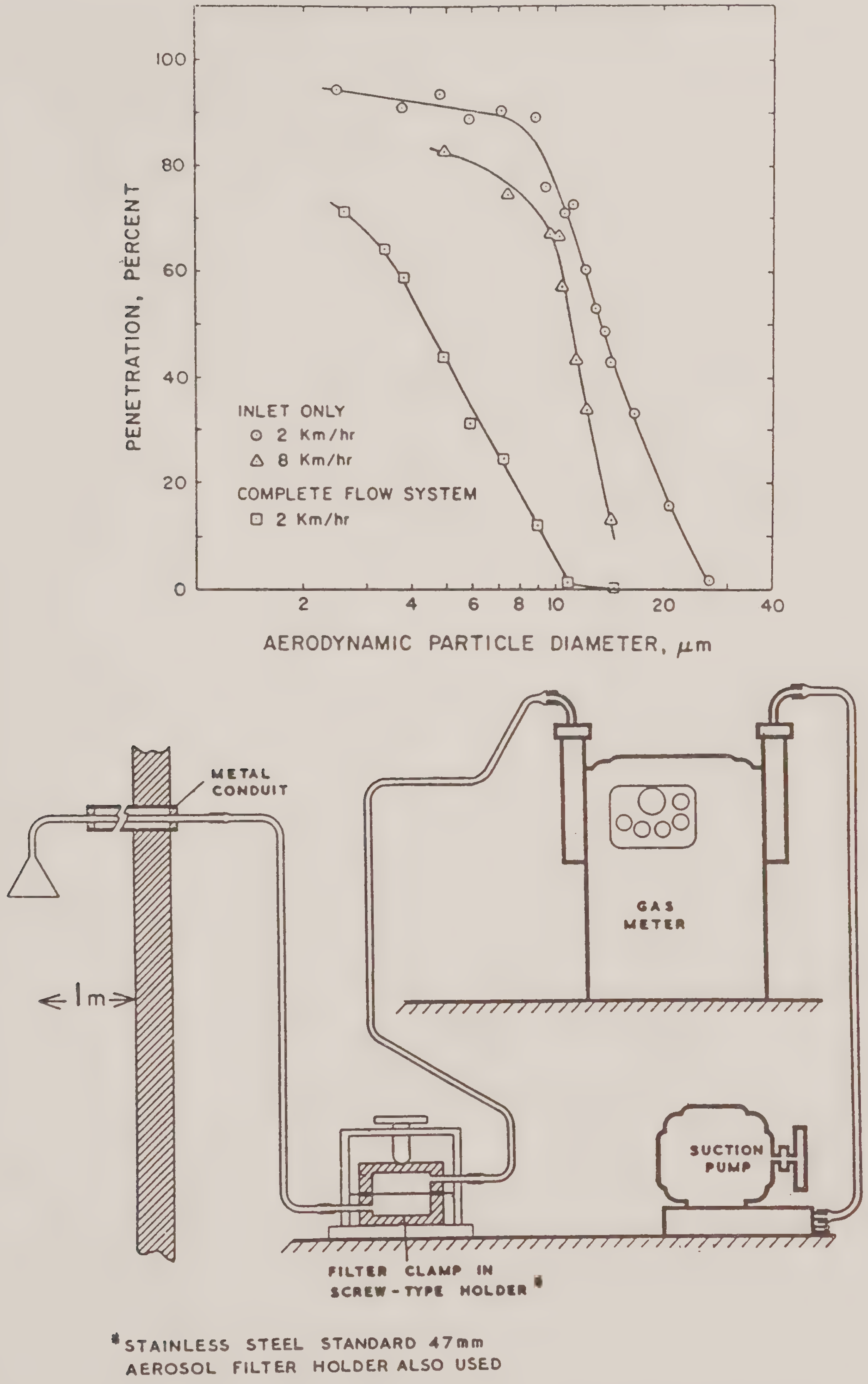


*STAINLESS STEEL STANDARD 47mm AEROSOL FILTER HOLDER ALSO USED

Figure 1. Basic Components of British Standard Black Smoke Sampler, Together with its Sampling Characteristics.

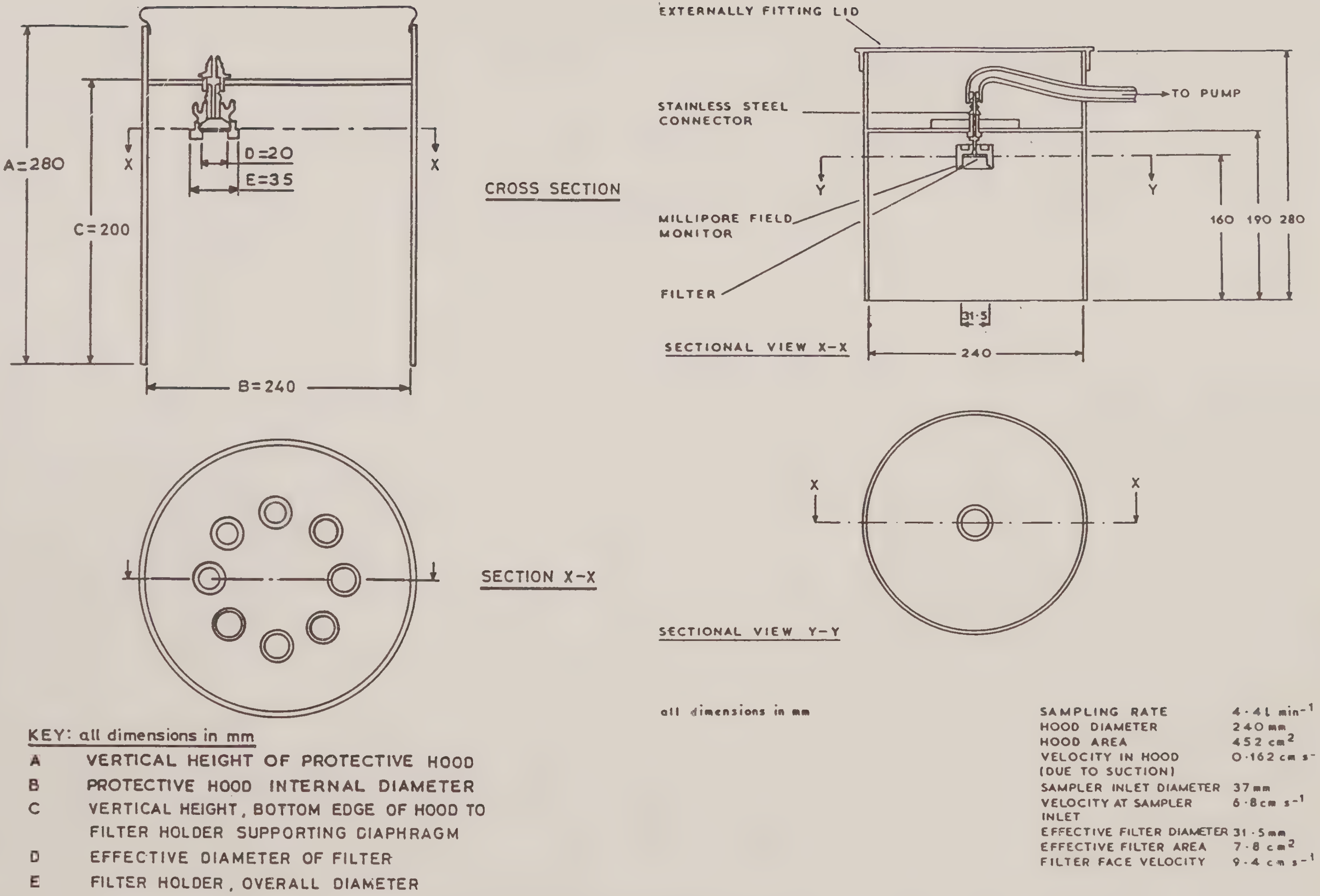

A=280
C=200
D=20
E=35
X
X
B=240
CROSS SECTION
SECTION X–X
KEY: all dimensions in mm
A VERTICAL HEIGHT OF PROTECTIVE HOOD
B PROTECTIVE HOOD INTERNAL DIAMETER
C VERTICAL HEIGHT, BOTTOM EDGE OF HOOD TO FILTER HOLDER SUPPORTING DIAPHRAGM
D EFFECTIVE DIAMETER OF FILTER
E FILTER HOLDER, OVERALL DIAMETER
EXTERNALLY FITTING LID
STAINLESS STEEL CONNECTOR
TO PUMP
MILLIPORE FIELD MONITOR
FILTER
Y
Y
160 190 280
31·5
240
SECTIONAL VIEW X–X
X
X
SECTIONAL VIEW Y–Y
all dimensions in mm
SAMPLING RATE 4·4 l min⁻¹
HOOD DIAMETER 240 mm
HOOD AREA 452 cm²
VELOCITY IN HOOD (DUE TO SUCTION) 0·162 cm s⁻
SAMPLER INLET DIAMETER 37 mm
VELOCITY AT SAMPLER INLET 6·8 cm s⁻¹
EFFECTIVE FILTER DIAMETER 31·5 mm
EFFECTIVE FILTER AREA 7·8 cm²
FILTER FACE VELOCITY 9·4 cm s⁻¹

Figure 2. Samplers Used for National Survey of Ambient Dust Levels;
a) Sulphate 'S' Type Sampler.
b) Metals 'M' Type Sampler.

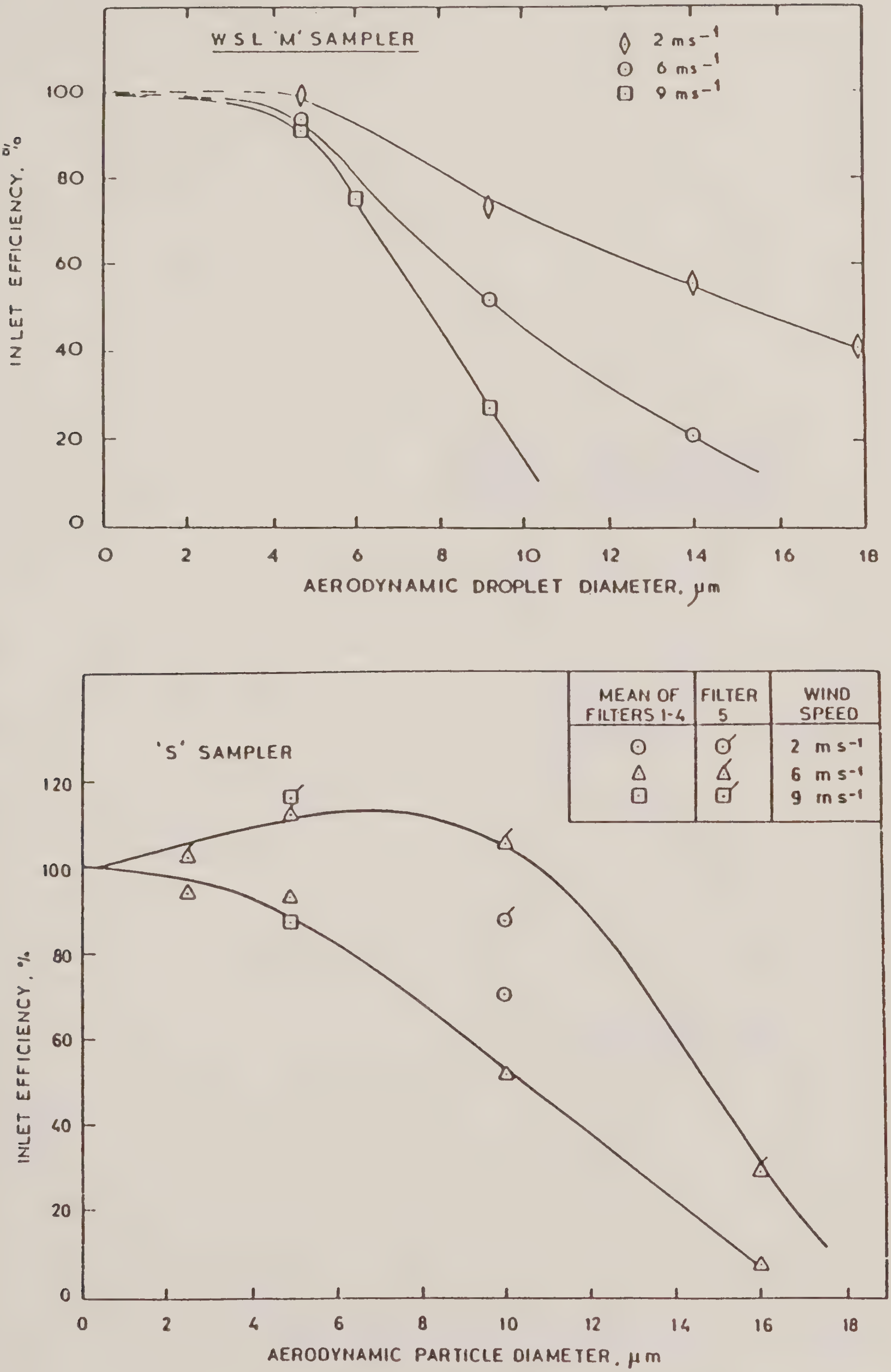


Figure 3. Performance of 'M' Type and 'S' Type Ambient Dust Samplers.

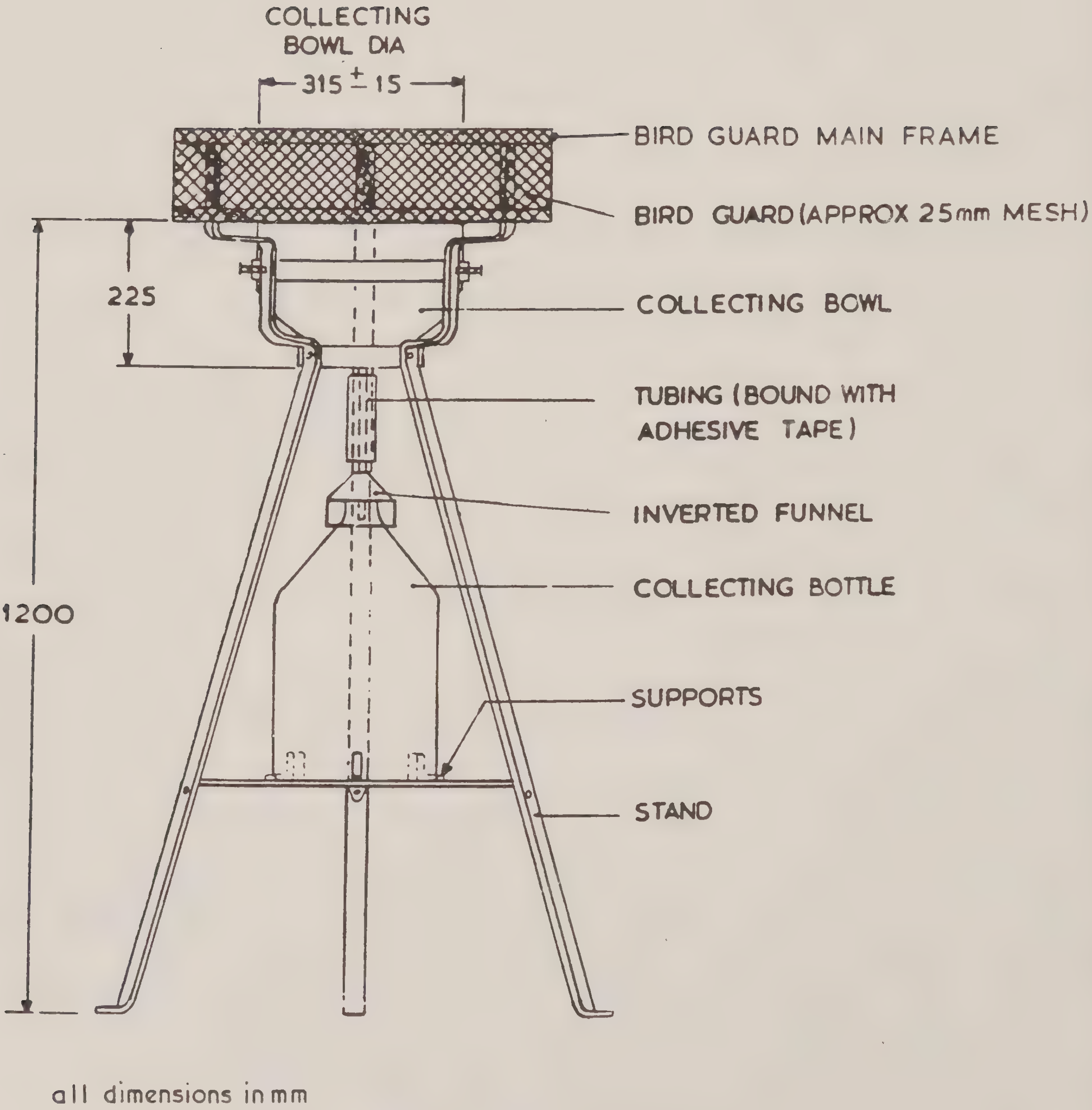


Figure 4. British Standard Horizontal Dust Deposit Gauge.

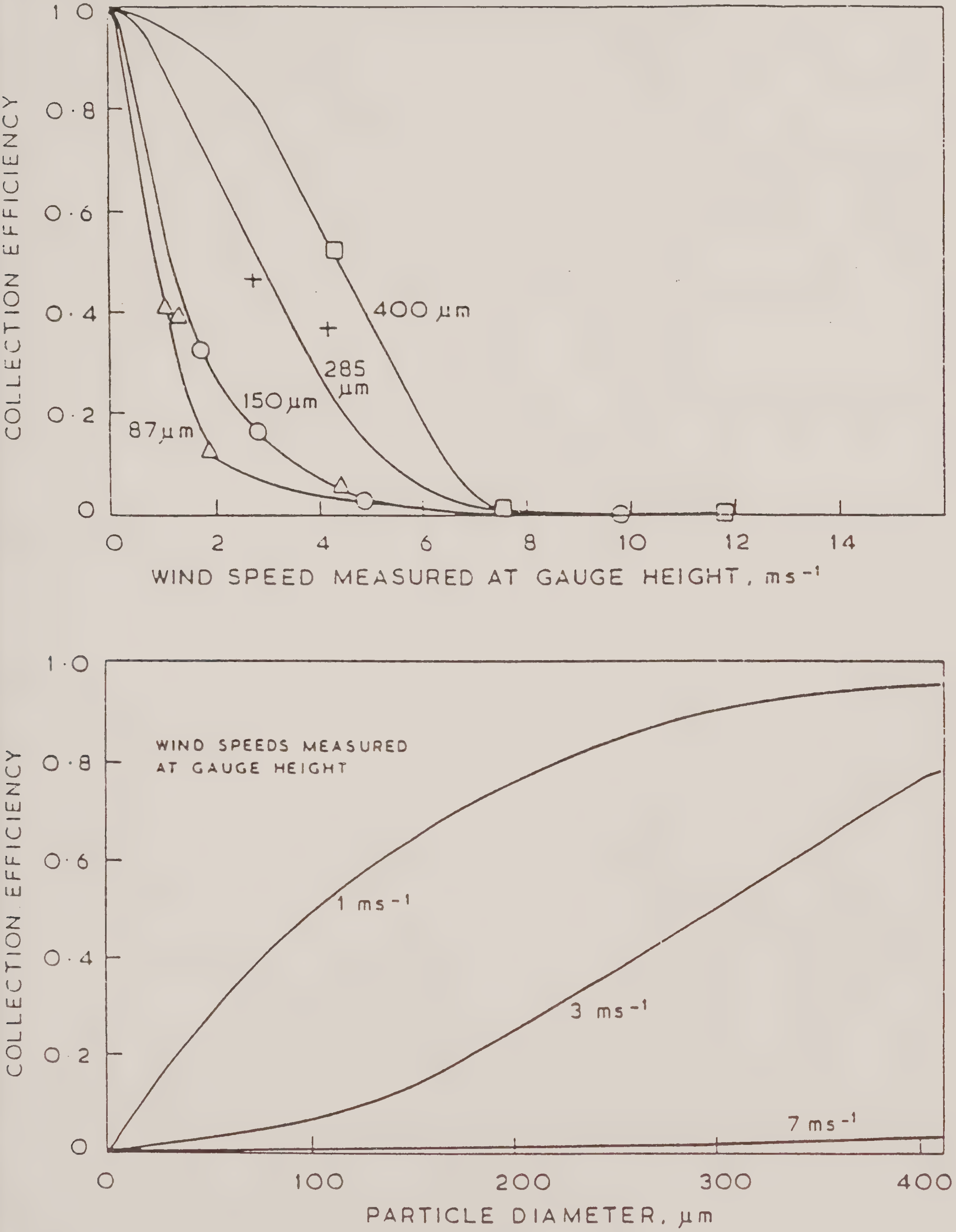


Figure 5. Performance of British Standard Horizontal Dust Deposit Gauge.

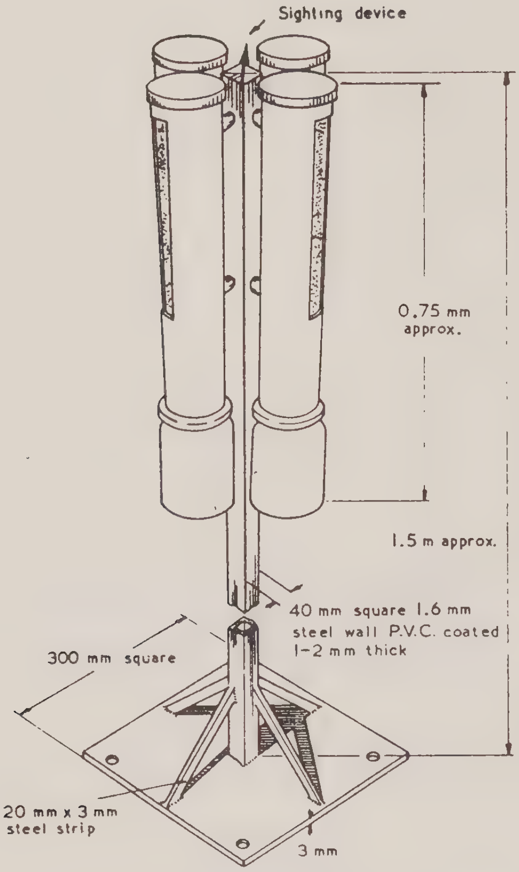


Figure 6. British Standard Directional Dust Gauge.

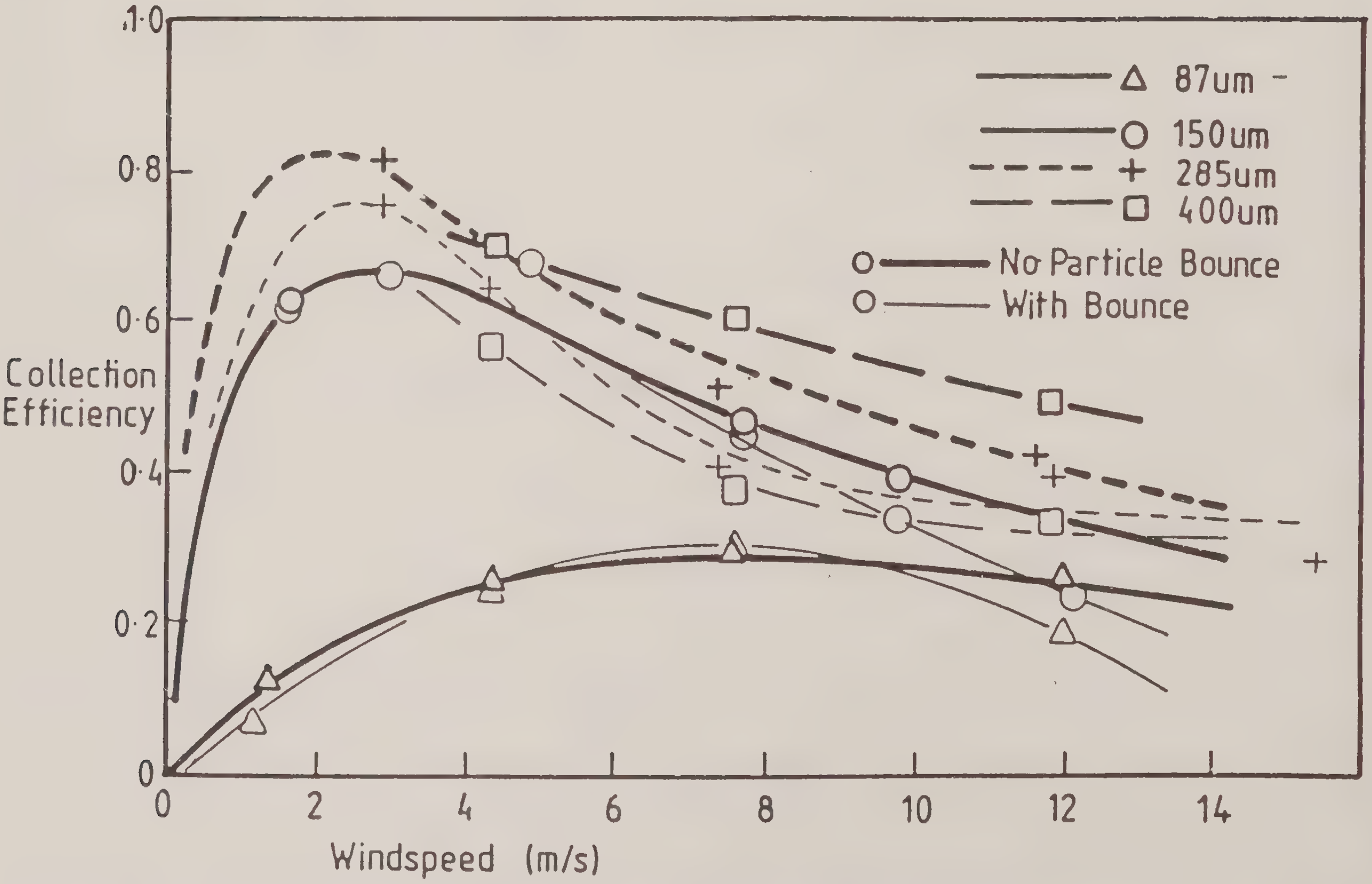


Figure 7. Performance of British Standard Directional Dust Gauge.

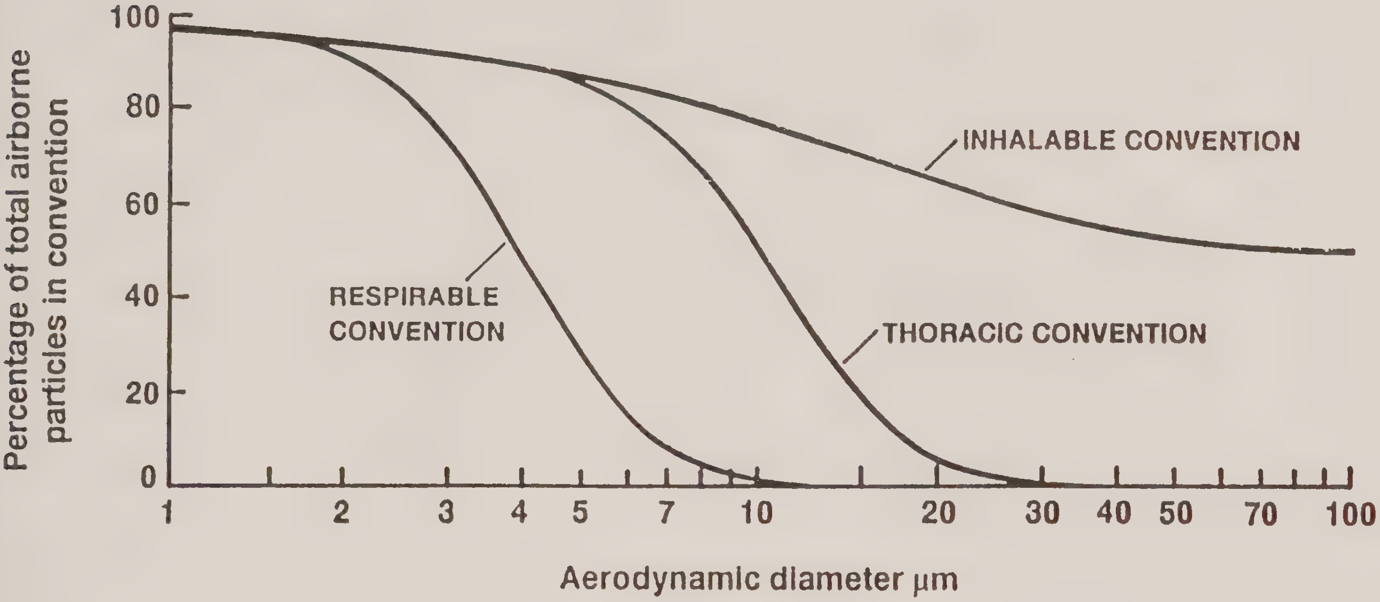


Figure 8. ISO Health Related Sampling Conventions.

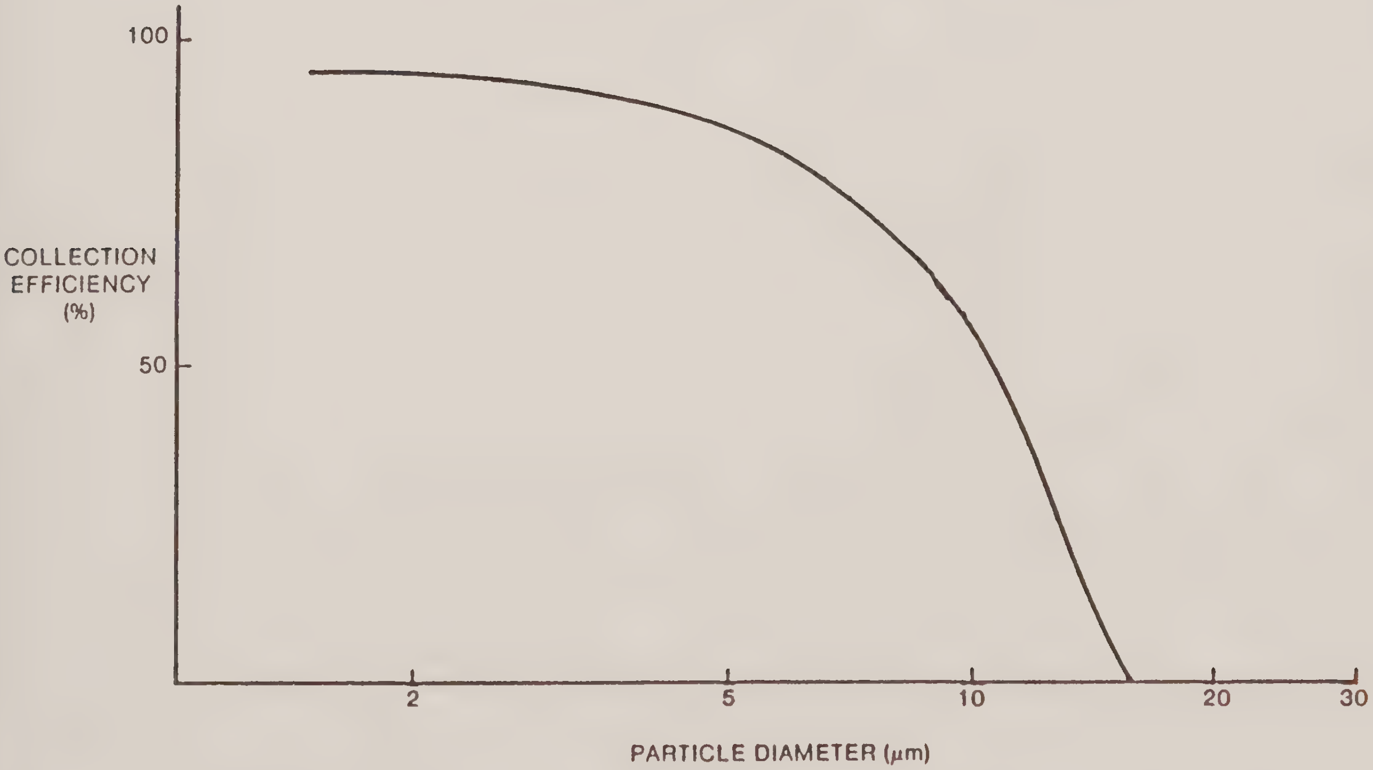


Figure 9. US Environmental Protection Agency PM10 Sampling Convention.

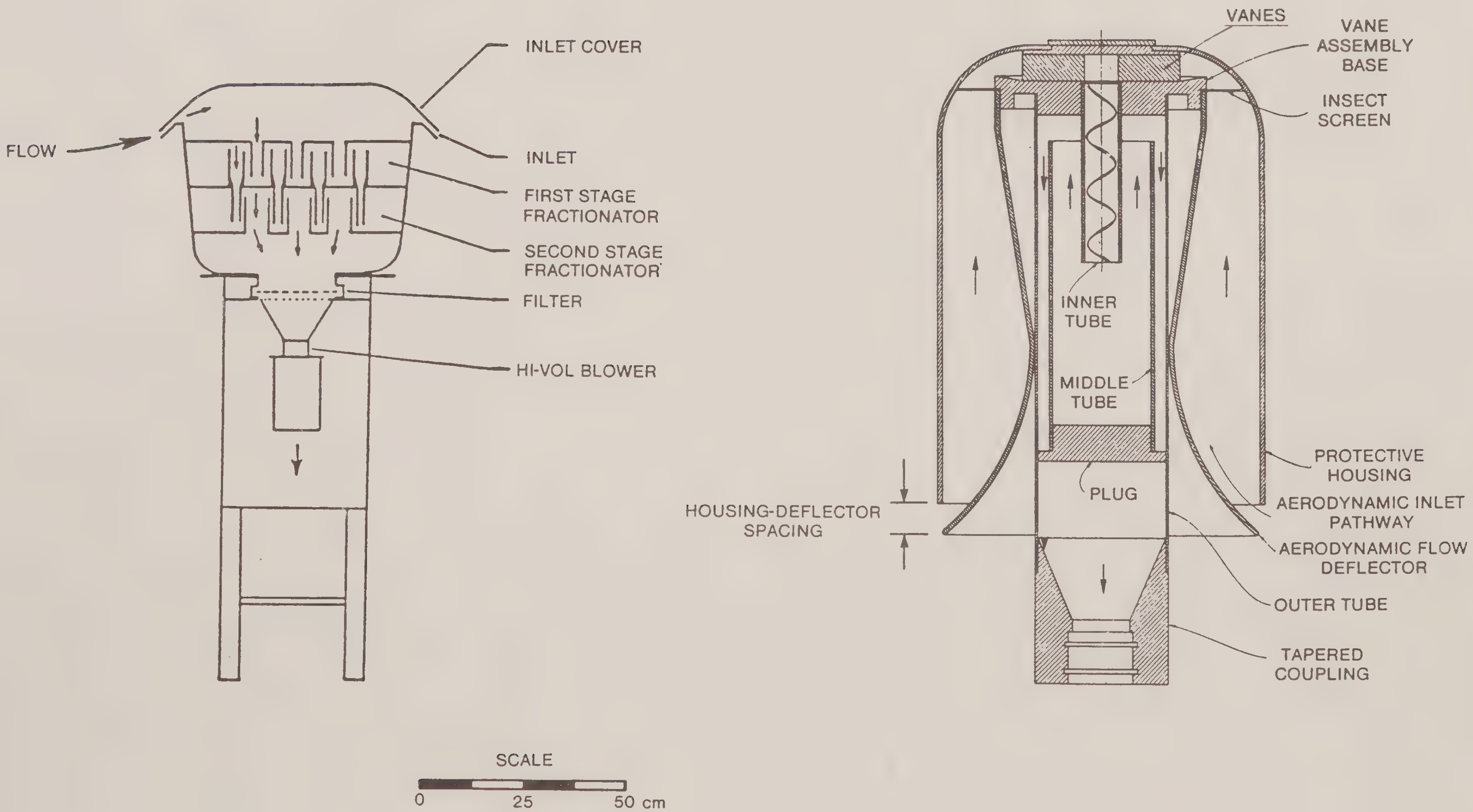
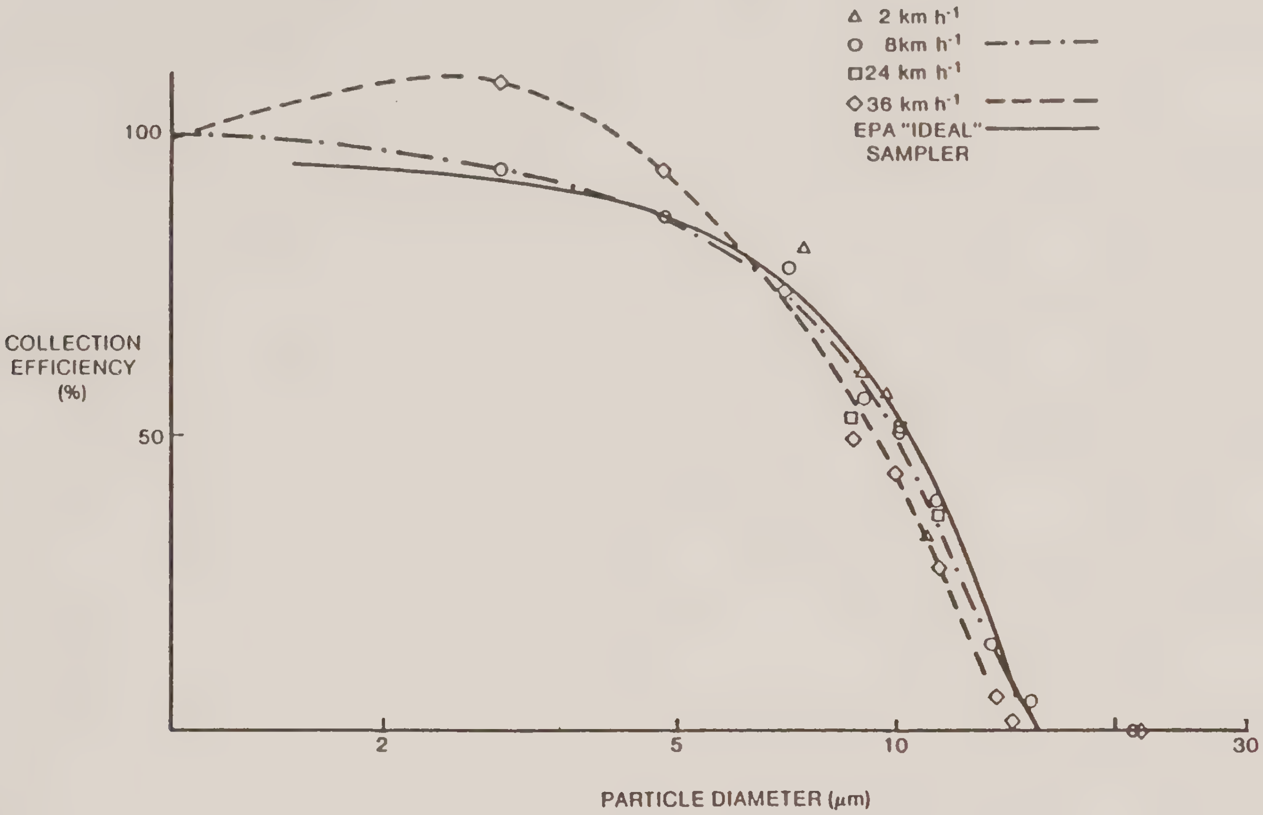


Figure 10. Samplers for PM10;
a) Sierra-Andersen 321A.
b) Inlet for EPA Dichotomous Sampler.



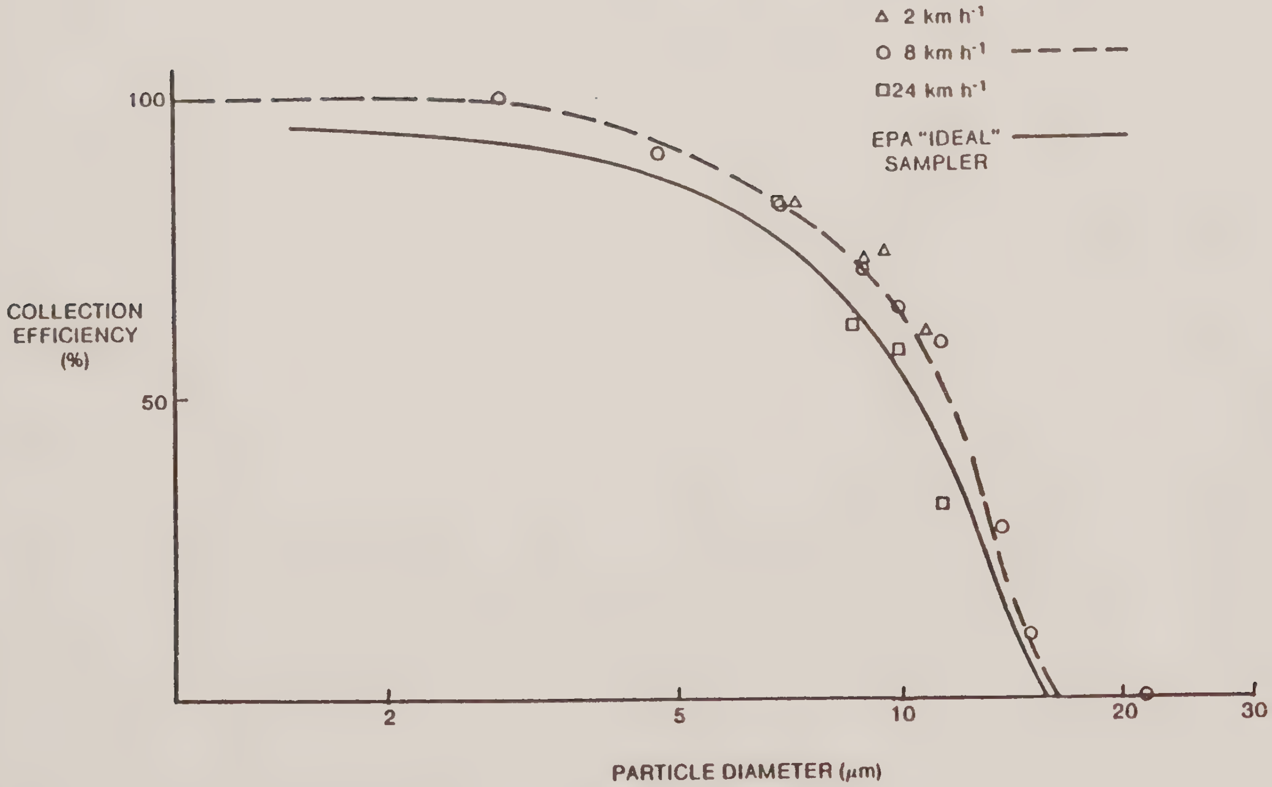
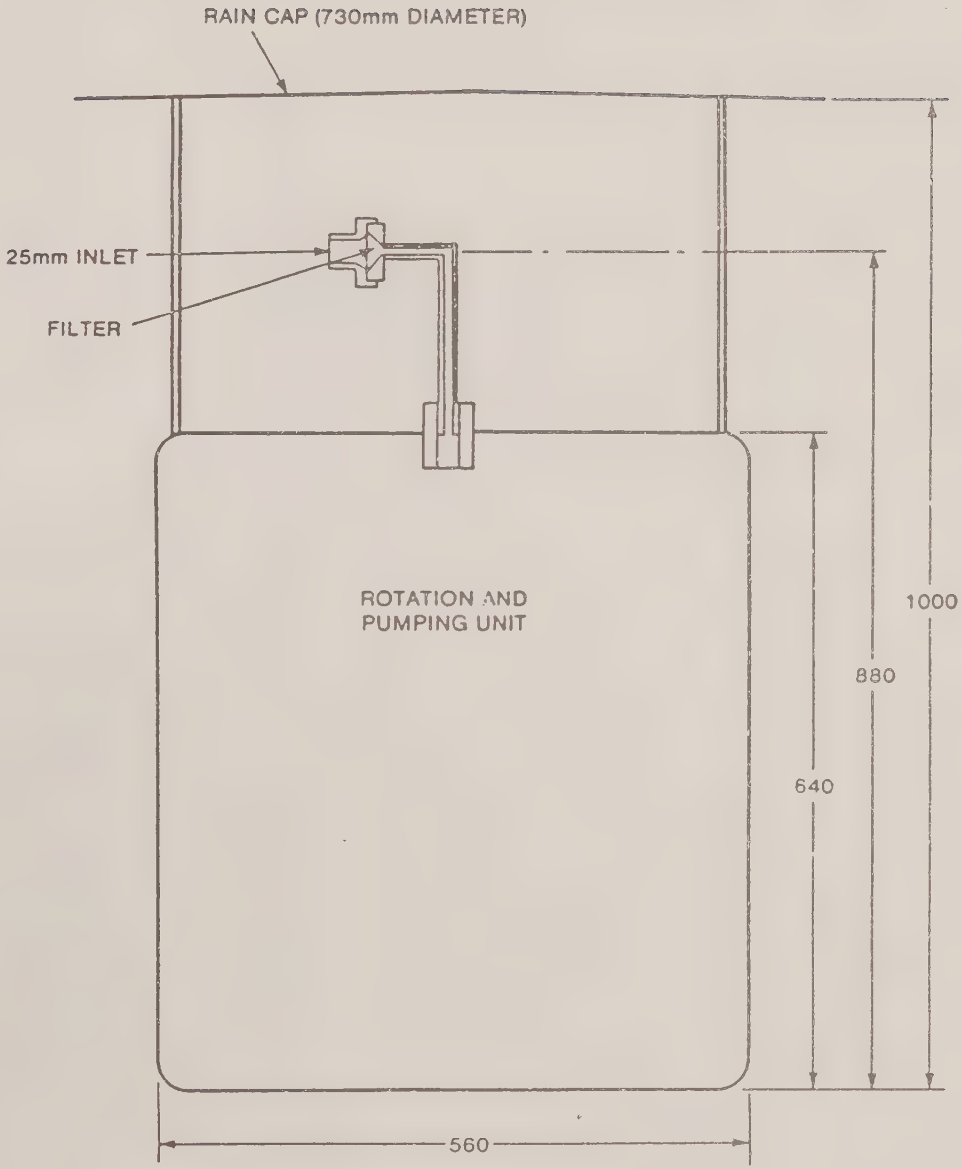


Figure 11. Performance of PM10 Samplers;
a) Sierra Andersen 321A.
b) EPA Dichotomous Sampler.



ALL DIMENSIONS IN mm

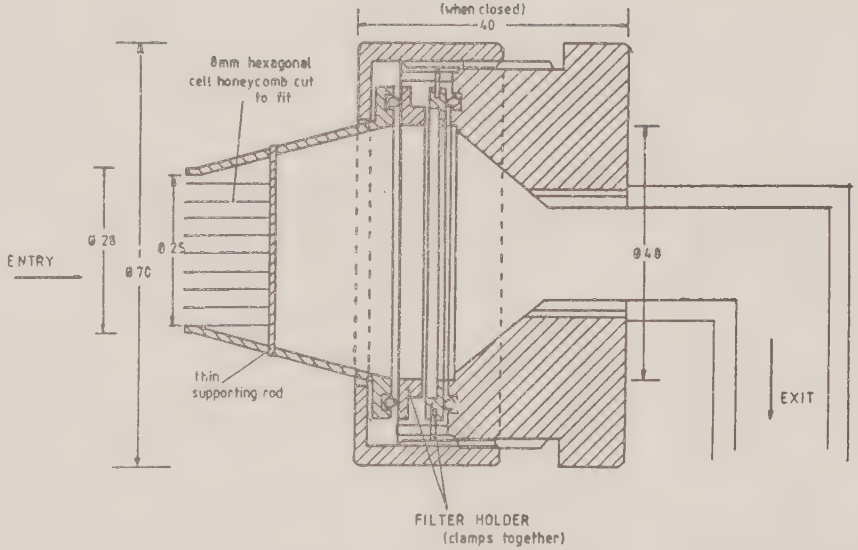

(when closed)
40
8mm hexagonal cell honeycomb cut to fit
ENTRY
Ø 28
Ø 25
Ø 70
Ø 48
thin supporting rod
EXIT
FILTER HOLDER (clamps together)

Figure 2. Diagram of Inhalable Inlet.

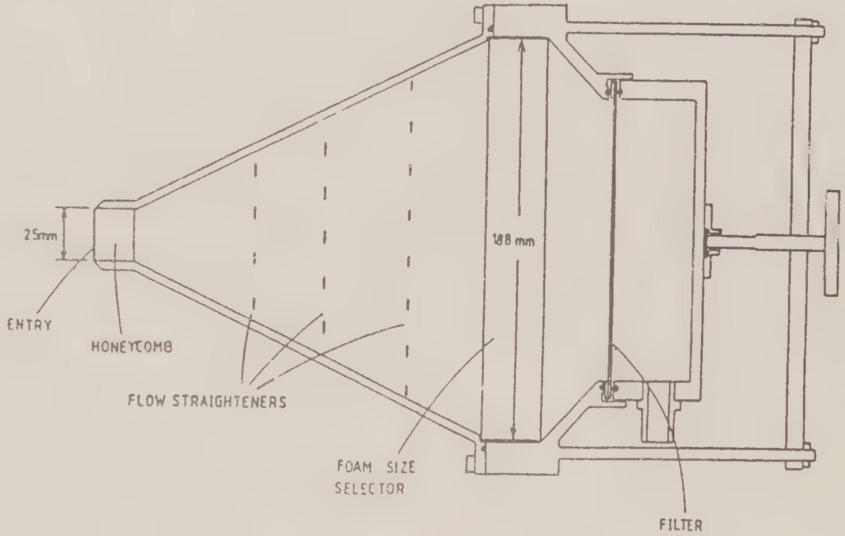


Figure 3. Diagram of Thoracic Inlet

Figure 12. Prototype IOM Sampler for Inhalable and Thoracic Dust in the Ambient Atmosphere.

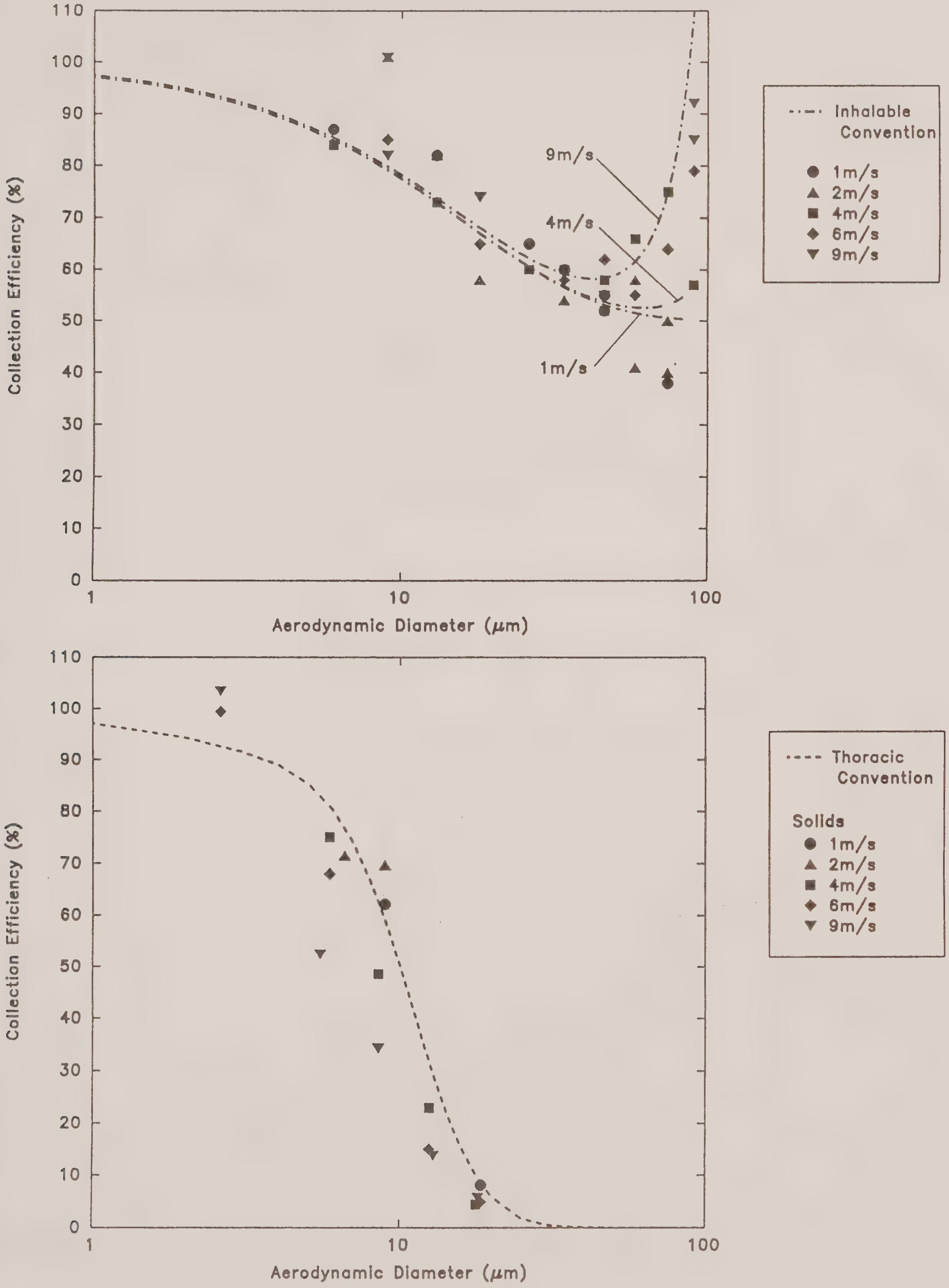
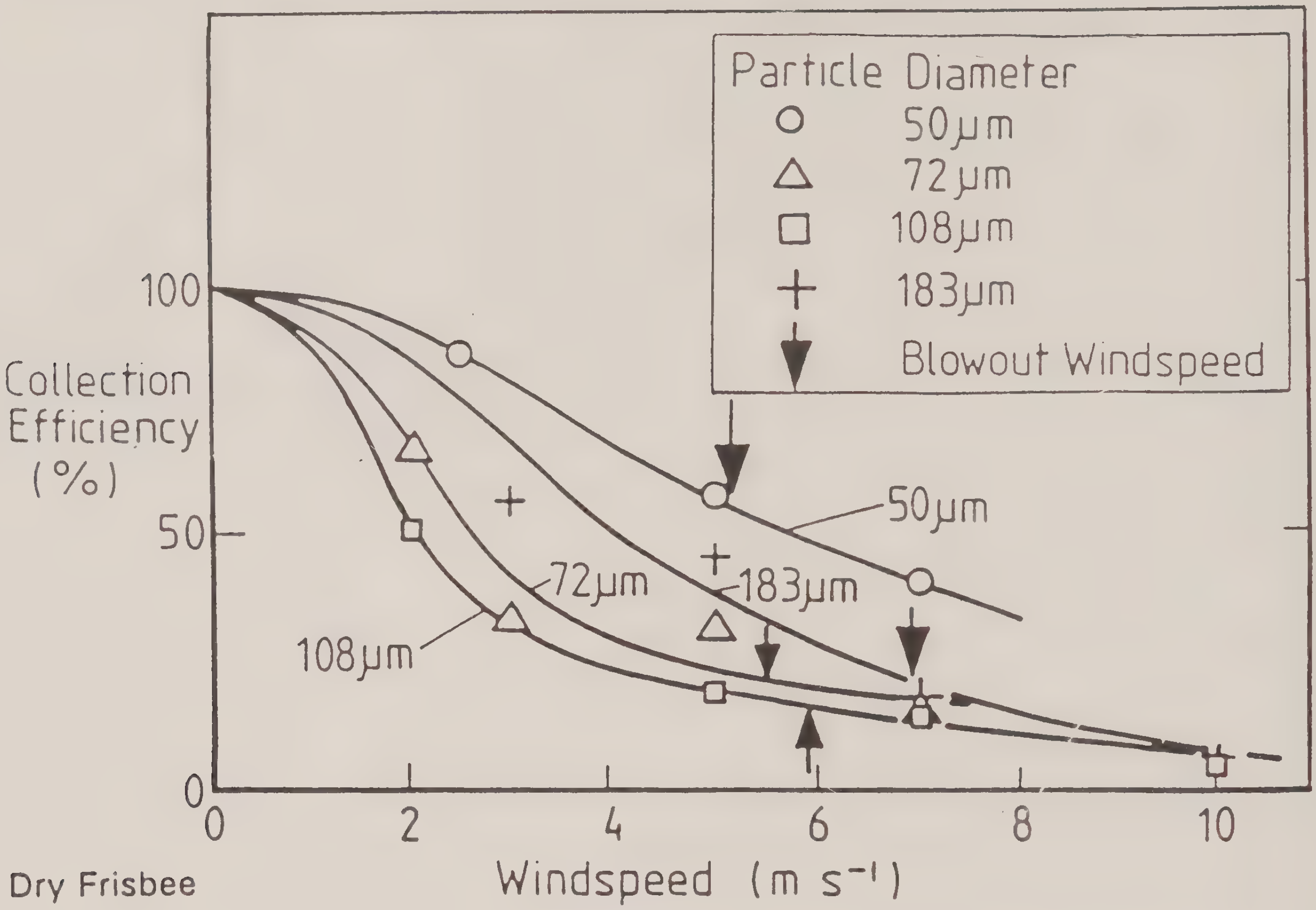
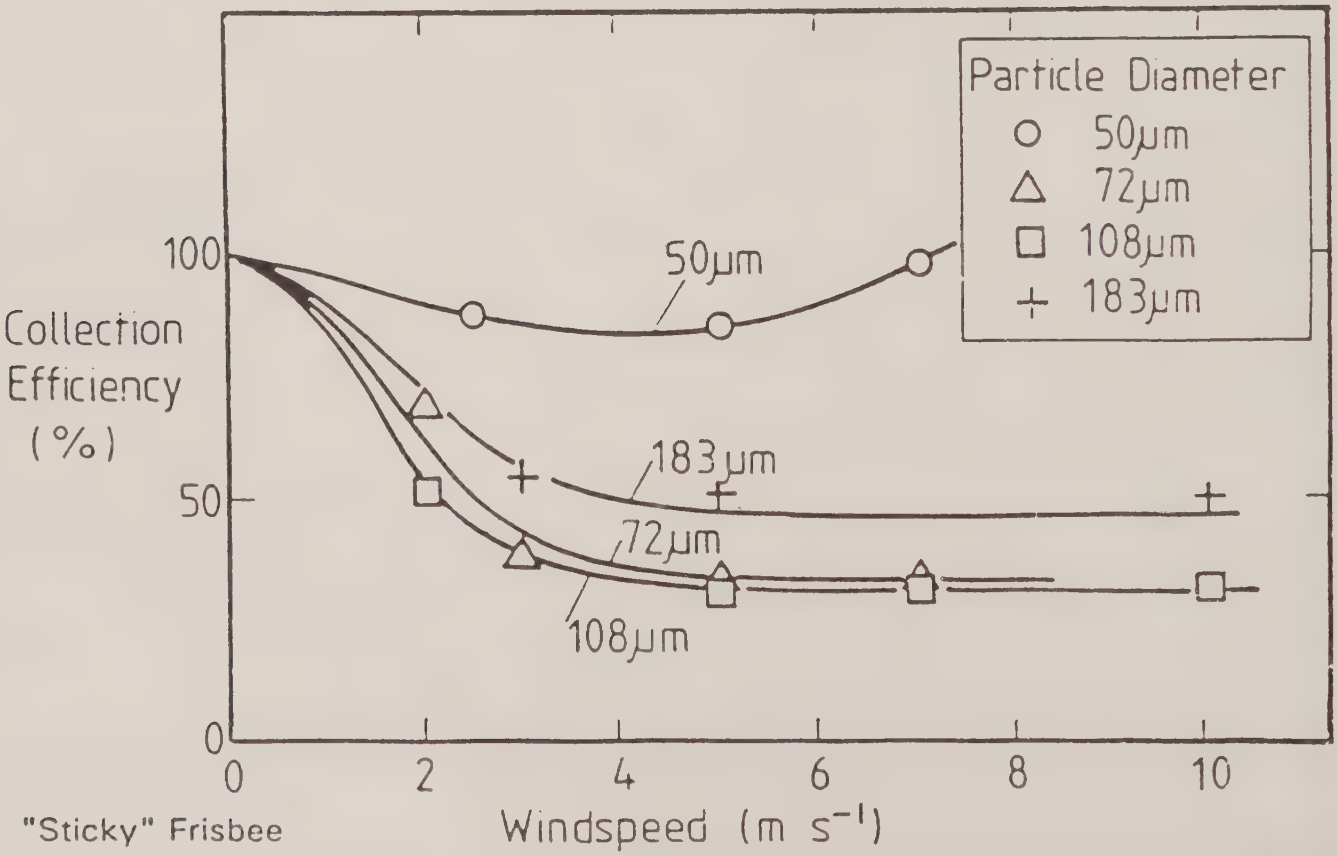


Figure 13. Performance of IOM Sampler;
a) Inhalable Dust.
b) Thoracic Dust.



a) Dry Frisbee



b) "Sticky" Frisbee

Figure 14. Performance of Inverted Frisbee Dust Deposit Gauge.

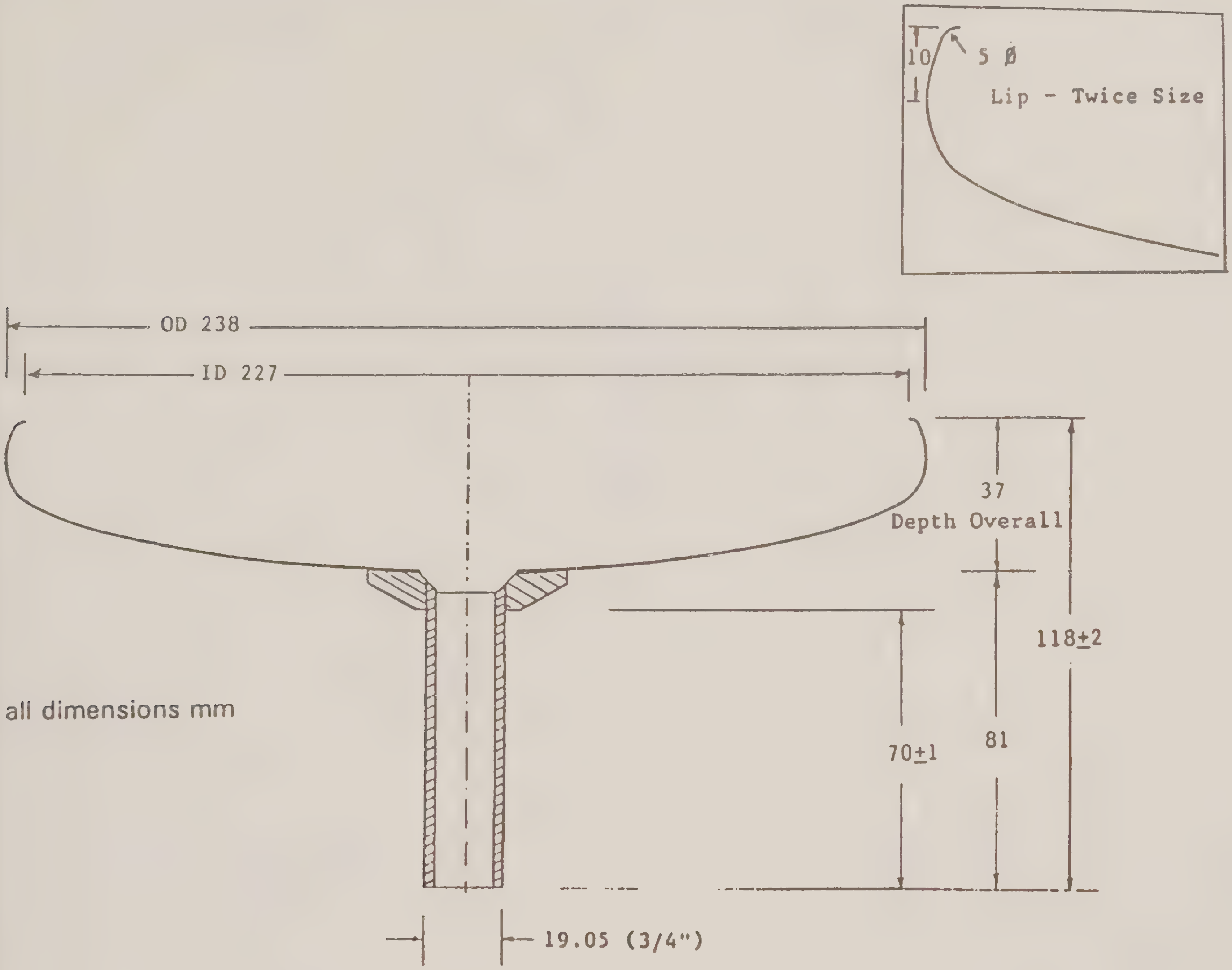


Figure 15. Section Through Metal Frisbee-Type Dust Deposit Gauge.

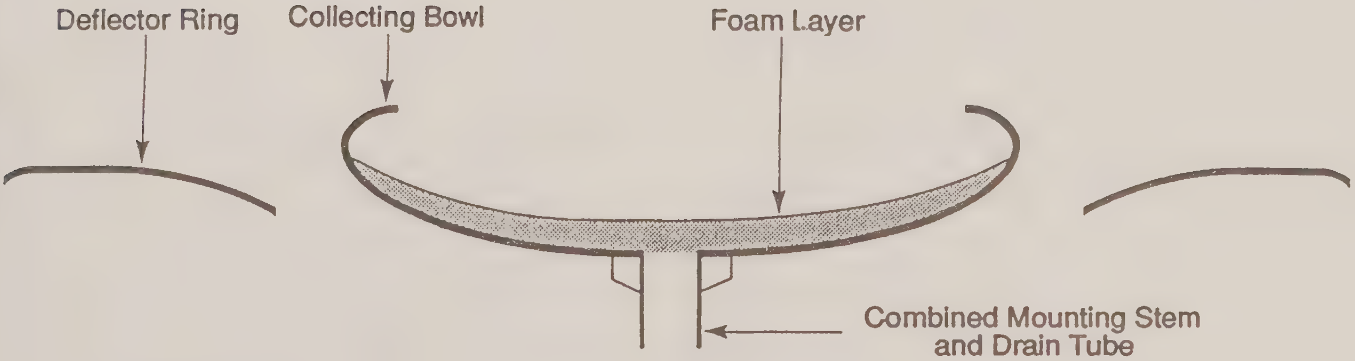
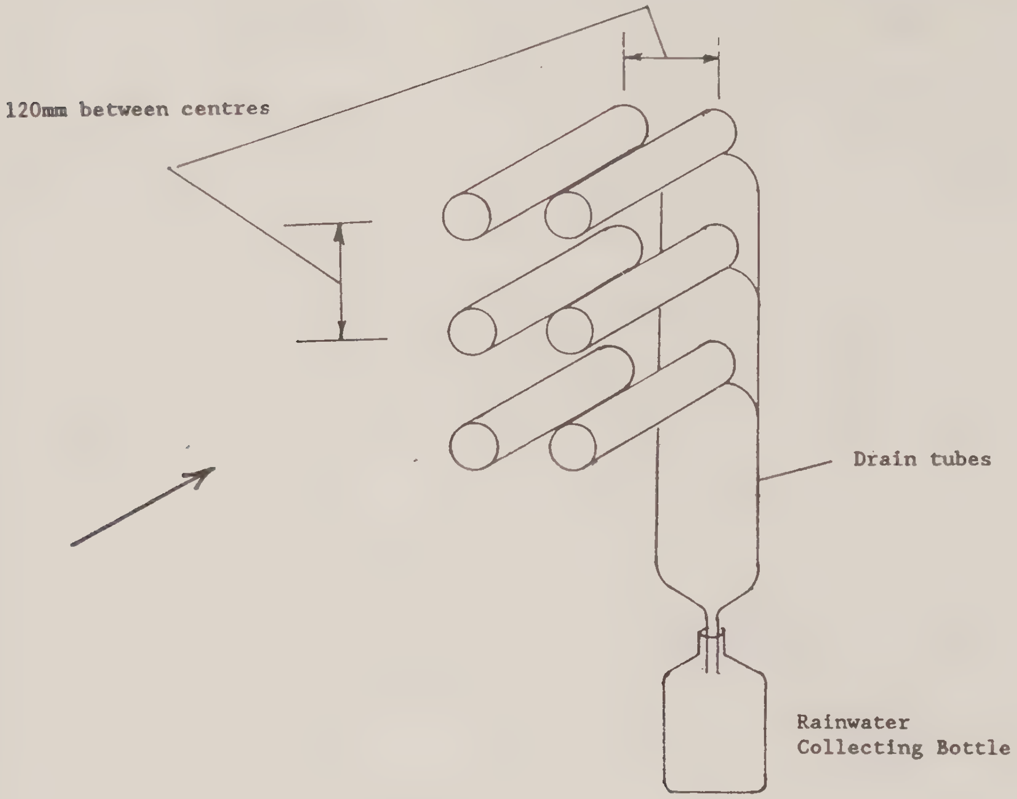
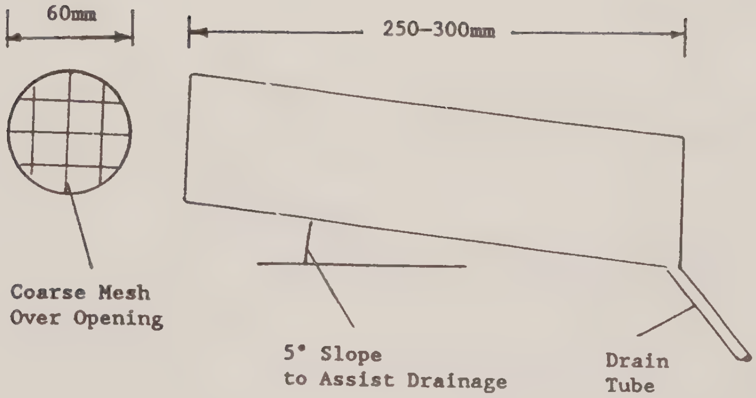


Figure 16. Cross Section Through the Collecting Head of the Improved Design of Deposition Gauge.



Layout of Sampling Tubes



Individual Sampling Tube

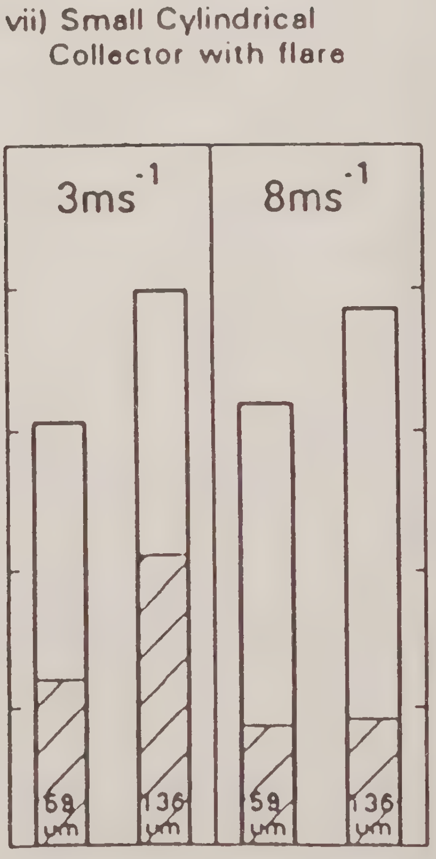


Figure 17. Tentative Design for a Closed Container Flux Gauge.

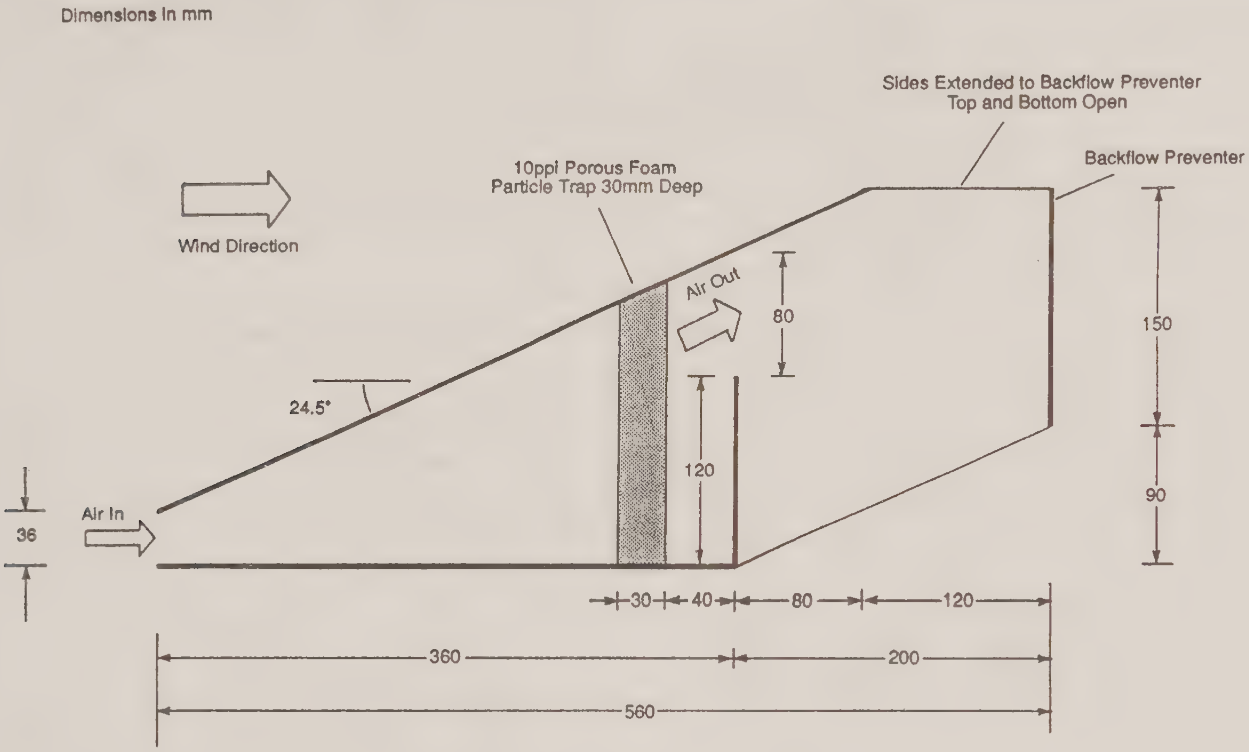

Dimensions in mm
Wind Direction
10ppi Porous Foam Particle Trap 30mm Deep
Sides Extended to Backflow Preventer Top and Bottom Open
Backflow Preventer
Air Out
Air In
24.5°
36
80
120
150
90
30
40
80
120
360
200
560

Figure 18. Cross Section Through the Improved Design of Flux Gauge.

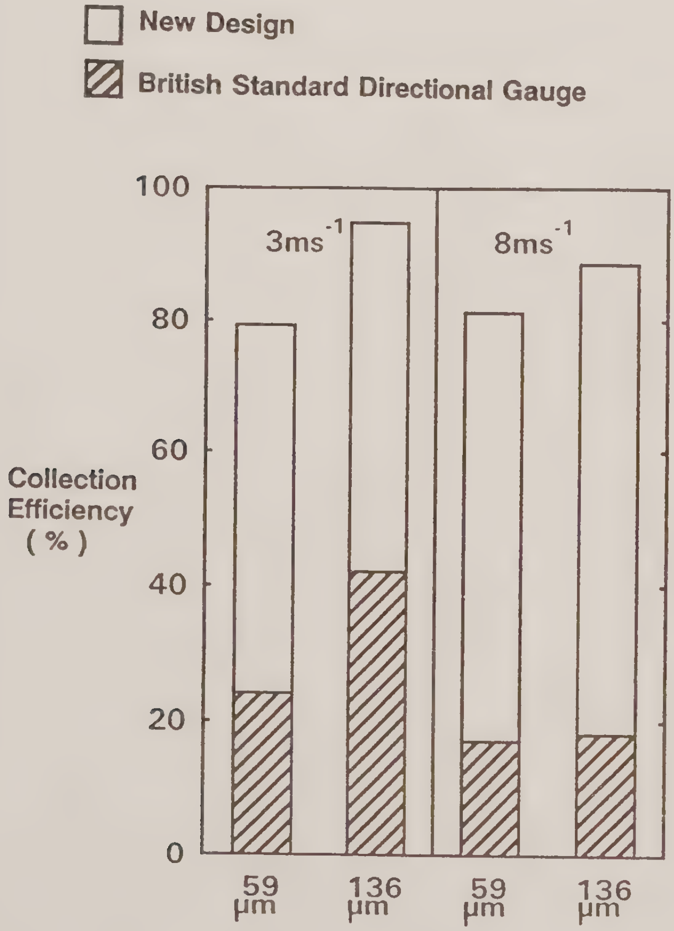


Figure 19. Performance of the Improved Design of Flux Gauge.

UPDATE

NOISE CODES OF PRACTICE

In response to a request from NSCA's National Noise Committee for clarification of the status of various codes of practice covering noise, the Department of Environment has confirmed the following:

There are currently four codes of practice which have been approved under section 71 of the *Control of Pollution Act 1974*. These are:

- *Noise Control on Construction and Open Sites (BS 5228)*; this is in four parts: Part 1 — basic information and procedures for noise control; Part 2 — guide to noise control legislation for construction and demolition; Part 3 — noise control applicable to surface coal extraction by opencast methods; Part 4 — noise and vibration control applicable to piling operations. Part 2 does not have approval under COPA and Part 4 has recently been revised by BSI and is awaiting approval.
- *Noise from Ice Cream Chimes etc.*, this code was prepared by the DOE and limits the use of chimes to between 12 noon and 7.00 pm.
- *Noise from Burglar Intruder Alarms*; this code was also prepared by the DOE.
- *Noise from Model Aircraft*; this was also prepared by the DOE.

There are a number of other draft codes with which the DOE has been involved at some stage or another; these are:

- *Clay Target Shooting*; two draft codes (1986 and 1989) were produced and issued for consultation in conjunction with the Clay Pigeon Shooting Association; many of the consultees (including NSCA) had reservations on both drafts on the grounds that they offered inadequate protection for those affected by clay pigeon shoots. In the continued absence of any approved code, the IEHO has now issued for comment a draft Professional Practice Note which has been prepared by a working group of the Midland Joint Advisory Council for Environmental Protection. This provides practical guidance on minimising noise from clay target shoots and it was hoped that this would be formally adopted by the IEHO before the end of 1993.
- *Audible Bird Scarers*; The DOE issued a draft statutory code in 1990 but respondents considered that more technical criteria were needed if the code was to be effective. The NFU has a code of practice which covers both auditory and visual bird scarers and it is hoping to issue a revised version soon.
- *Off-Road Motorcycling*; A draft code prepared by the Noise Council in association with NSCA, the Manchester Area Pollution Advisory Council, the Motor Cycle Industry Association, the Autocycle Union

and the Amateur Motorcycling Association was issued for consultation in 1991. On the basis of comments received, the code has been revised and a new draft is expected shortly.

- *Noise Control at Pop Concerts*; A draft code prepared by the Noise Council with the help of a working group and in consultation with promoters is currently out for consultation. It is hoped to finalise this code for publication during the Spring of 1994.

  The Health and Safety Commission, Home Office and Scottish Office have recently published their *Guide to Health, Safety and Welfare at Pop Concerts and Similar Events*. In so far as this covers noise it deals with the health and safety aspects of noise control.

- *Water Sports*; In 1988 NSCA prepared a draft code in conjunction with a number of other organisations which was submitted to the DOE for approval. However responses from different interest groups revealed conflicting views and the code has not been progressed.

Finally NSCA is supporting the preparation of a code on noise from stock car racing; this is being prepared by a working group and it is hoped to issue it for consultation during 1994.

NOISE AND STATUTORY NUISANCE ACT

This Act which began life as a Private Member's Bill promoted by Andrew Hunter MP came into effect on 5 January 1994 (except for the burglar alarm provisions).

The Act gives effect to some of the noise nuisance problems highlighted by the Noise Review Working Party Report of 1990 ("The Batho Report"). The Act extends the powers of local authorities to deal with noise from vehicles, equipment and machinery on the street:

- local authorities are given a duty and powers to investigate and take action in respect of noise emitted in the street from vehicles, machinery or equipment — including special powers of entry to enable them, for example, to take action to de-activate vehicle alarms where the terms of a noise abatement notice have not been complied with.
- local authorities have discretionary powers to grant consent for the use of loudspeakers used for non-advertising purposes outside of the nationally permitted timeband of 8am to 9pm. Conditions may be imposed on any consent. The purpose of the provision is primarily to enable bone fide charity and other entertainment events to use loudspeakers later than 9pm if the local authority considers this appropriate.
- local authorities are also given discretionary powers enabling them to deal more effectively than under existing legislation with burglar alarms which continuously ring without good reason. Under this power, local authorities will be able to require alarms to comply with any prescribed technical standards; require the notification to the police of key holders' names to contact when owners are absent; and ask a magistrate for a warrant to enter premises if necessary for the purpose of stopping and, if possible,

resetting alarms. (London Boroughs already have almost identical powers which have been available since 1991). This section of the Act will require an order bringing it into force.

- the final new power for local authorities only applies in England and Wales and enables them to put a legal charge on premises to recover expenses reasonably incurred in abating a statutory nuisance under Part III of the *Environmental Protection Act 1990.*

The Department of Environment is preparing a draft circular for consultation giving guidance to local authorities on these new powers.

CLIMATE CHANGE CONVENTION

The UK Government has ratified the UN Framework Convention on Climate Change agreed at the 1992 Earth Summit in Rio and signed by over 150 participating countries.

The Convention requires developed countries to take measures aimed at returning emissions of greenhouse gases (the most important of which is carbon dioxide) to 1990 levels by the year 2000, and to provide assistance to developing countries. All parties to the Convention are required to compile inventories of emissions, to produce and publish national programmes of measures to limit emissions, and to promote research and public education on climate change.

The UK Government has drawn up a national programme aimed at achieving emission reductions equivalent to some 10 million tonnes of carbon (MtC) by the year 2000 from the following sectors: energy consumption in the home – 4MtC; energy consumption by business – 2.5 MtC; energy consumption in the public sector – 1 MtC; transport 2.5 MtC. The Government's detailed programme covering each of these areas was expected to be published in January 1994.

The Convention requires ratification by 50 countries before it can come into force and it is hoped this will be achieved early in 1994.

NEW NAMES FOR EUROPE

The final ratification of the Maastricht Treaty in November 1993 has resulted in a few changes in "Europe". Firstly, the Treaty has created the "European Union" – i.e. the twelve members countries of the European Community (EC); secondly, an amendment to the Treaty of Rome by the Maastricht Treaty does away with the "European Economic Community" and replaces it with the European Community. Proposals, legislation etc emanating from Europe may correctly be called either EC or EU policies except those relating to common foreign and security policy and home affairs and justice policy which should be referred to as EU policy.

Following on from the creation of the European Union, the Council of Ministers has renamed itself the Council of the European Union; the Commission of the European Communities becomes the European Commission. *(From Institute of European Environmental Policy Communication).*

BOOKS AND REPORTS

HAZARDOUS WASTE MANAGEMENT
Technical and legislative prospects

B. Price, Financial Times, 1993. £274. ISBN 1853342033.

Following the 1990 report, this presents an account of developments in the management of all forms of hazardous waste. It examines the implications of legislative change within Europe and the UK and the social and political issues surrounding disposal processes such as landfill sites and incineration. It also looks at options and technology and contamiated land. It is aimed at senior management in industry, lawyers and legislators.

ACHIEVING ENVIRONMENTAL MANAGEMENT STANDARDS
A Step-by-Step Guide to Meeting BS 7750

M.J. Gilbert, Pitman Publishing, 1993. £14.95, ISBN 0273600796.

The book provides practical advice and guidance for managers responsible for implementing environmental management systems (EMS). It covers objectives, planning and implementation of an EMS and assessment.

CRITICAL CONDITION
Human Health and the Environment

Ed. E. Chivian and others, The MIT Press, 1993. £14.25, ISBN 0262531186.

This report by Physicians for Social Responsibility aims to present current medical information about the environment. The collection of papers includes urban air pollution, water, food contamination, occupational exposures and global problems like population and ozone depletion. The authors believe that major changes are needed in the way people live in developed and developing countries.

CONTAMINATED LAND AND LAND REMEDIATION
Guidance on the Issues and Techniques

Chemical Industries Association, 1993. £40.00 set or £7.50 each, ISBN 1858970067, 1858970075, 1858970083.

Three booklets offering background guidance to small and medium sized companies on contaminated land issues. Booklet 1, Guidance on the issues and techniques, covers legislation, liabilities and costs; Booklet 2, Avoiding Contamination, helps to identify practices that avoid soil and groundwater contamination. Booklet 3 – Site assessment, data evaluation and review, gives more detailed guidance and outlines elements of site assessment.

EC ENVIRONMENT GUIDE

The EC Committee of the American Chamber of Commerce in Belgium, 1994. BEF 1 500 (approx £28), ISBN 2930073020.

A comprehensive guide to environmental legislation and contacts in the EC. It covers policy, European Community institutions, national environmental affairs in each of the member states and the US and in governmental and non-governmental organisations.

EUROPEAN ENVIRONMENTAL STATISTICS HANDBOOK

Ed. Foster, A., Newman, O., Gale Research International, 1993. £60.00, ISBN 1873477600.

This reference volume contains over 750 tables of environmental statistics mostly from 1991-1992. It is arranged in ten broad chapters including pollution, costs and expenditures, effects, public opinion, government and industrial data. Although some of the information is difficult to interpret out of context, it is comprehensively sourced.

THE ENVIRONMENTAL DATA BOOK

A guide to Statistics on Environment and Development

The World Bank, Microinfo Ltd, 1993. £6.25. ISBN 0821323342.

Two data tables contain environmental economic and social indicators for 128 countries, and ten colour charts highlight key information. Although aimed at secondary schools, the statistics provide a useful overview of current trends.

SENSE AND SUSTAINABILITY

Land use Planning and Environmentally Sustainable Development

M. Jacobs, CPRE, £7.00.

The report is aimed at those involved in planning and sets out principles and practice aimed at helping planners to meet the objective of sustainable development. It outlines six principles for sustainable planning.

THE ECO-MANAGEMENT AND AUDIT SCHEME: A PRACTICAL GUIDE

R. Hilary, Technical Communications, 1993, £24.95. ISBN 0946655812.

This report sets out the Eco-management and audit scheme and sets it in the context of the EC approach to the environment outlined in the 5th Action Programme. It looks at putting the scheme in place, validation, links with national and international standards, benefits and pitfalls and case studies.

RECYCLING AND WASTE

M. Gandy, Avebury Studies in Green Research, 1993. £37.50, ISBN 1856285421.

A study of municipal waste which looks at the debates surrounding recycling and discusses whether national targets are achievable under contemporary legislative policy making framework and identifies barriers to higher rates of recycling.

FUTURE EVENTS

16 FEBRUARY — NEIGHBOUR NOISE — WHAT NEXT?
This one day seminar will examine the latest research on neighbour noise, as well as the developing legislative and institutional responses.
Venue: Gallery Suite, National Exhibition Centre, Birmingham.
Details: NSCA. Tel: 0273 326313.

3 MARCH — VOLATILE ORGANIC COMPOUNDS
This one day seminar is aimed at those companies who face decisions on how to deal with VOCs. Speakers from industry will discuss benefits of process change and the new and emerging abatement technologies to eliminate VOCs at source.
Venue: Forte Crest Bloomsbury Hotel, London WC1
Details: Amanda Wright, IBC Technical Services. Tel: 071 637 4383.

3 MARCH — NSCA DIVISIONAL SEMINAR
Organised by NSCA's South West Division and hosted by South Somerset DC, speakers will discuss ideal air quality management, the *Noise and Statutory Nuisance Act 1993*, and Local Agenda 21.
Venue: Council Chambers, South Somerset DC.
Details: John Jefferies, Hon. Sec, NSCA SW Division. Tel: 0272 223343.

7 MARCH —
WASTE PROCESSES UNDER IPC & LAAPC: LEGAL ISSUES
This one day course provides an understanding of the implications and effect of the new environmental legislation with particular reference to waste processes under IPC and LAAPC.
Venue: Gladstone Conference Centre, Chester.
Details: IWM Business Services Ltd. Tel: 0604 20426.

14-16 MARCH — SITE LICENSING
This course is aimed at those engaged in the preparation of site licences. It will involve a high degree of participation on behalf of the students who will be expected to prepare a working plan and draft licence conditions for a proposed site.
Venue: Knuston Hall, Irchester, Northamptonshire.
Details: IWM Business Services Ltd. Tel: 0604 20426.

16 MARCH — RISK ASSESSMENT
This one day course will be of interest to those with strategic decision making responsibility within the waste industry. It aims to give delegates the appropriate knowledge and practical skills which will enable them to make basic work place risk assessments with confidence.
Venue: Clifton Hill House, Bristol University.
Details: IWM Businss Services Ltd. Tel: 0604 20426.

17 MARCH –
EUROPEAN COMMUNITY ENVIRONMENTAL LEGISLATION

This one day seminar will include EC environmental legislation; how the EC legislative process works; influencing EC environmental legislation; even enforcement of environmental legislation; development of international environmental standards and EC environmental information – disclosure requirements v confidential concerns.
Venue: Belgrave Square, London, SW1.
Details: SCI Conference Secretariat, 14/15 Belgrave Square, London, SW1X 8PS.

22-24 MARCH – ENVIRONMENTAL TECHNOLOGY '94

Environmental Technology deals with all aspects of the environment business, including air, water, land, energy, noise, waste, recycling and emergency response, as well as every type of product or service, including instrumentation, abatement technology, process and materials, laboratory analysis, consultancy, legal advice, education, and public sector services.
Venue: National Exhibition Centre, Birmingham.
Details: Sara Binns, Reed Exhibitions. Tel: 081 948 9940.

27-29 MARCH – INTRODUCTION TO WASTE MANAGEMENT

This two and a half day introductory course is designed to ensure a thorough basic understanding of all aspects of wastes management in the UK, and will be of value to those recently joining the field of wastes management in both the private and public sectors.
Venue: Knuston Hall, Irchester, Northamptonshire.
Details: IWM Business Services Ltd. Tel: 0604 20426.

11-15 APRIL –
CORPORATE ENVIRONMENTAL AWARENESS EASTER SCHOOL

This school will introduce all aspects of environmental protection and will be of interest to those with environmental responsibilities and to those managers wishing to learn more about the constraints and opportunities arising from environmental issues.
Venue: New College, Oxford.
Details: Amanda Wright, IBC Techinical Services Ltd. Tel: 071 637 4383.

13-14 APRIL – LOCAL AIR QUAITY MANAGEMENT – TOWARDS A PRACTICAL PROGRAMME FOR THE UK

The right mix of measures for local circumstances is needed to get the best local air quality at least cost, and to contribute to meeting national and international goals. Thirteen invited speakers will review all aspects of air quality management systems. The aim will be to establish general principles (by discussion of practical experience under diverse conditions) and to consider how to develop the concept in the UK.
Venue: Milton Hill House, Abingdon, Oxfordshire.
Details: NSCA. Tel: 0273 326313.

LOCAL AIR QUALITY MANAGEMENT

A Supplement to CLEAN AIR, Winter 1993

The idea of local air quality management has been developed in the USA, but is new to the UK. Put simply, the aim is to target the key sources of air pollution by discovering how bad the pollution is, finding out where it is coming from, and implementing a plan to do something about it.

This supplement is intended to bring readers up to date with the story so far, and looks ahead to the potential for air quality management to make a real impact at local, national and international level.

AN INTRODUCTION TO LOCAL AIR QUALITY MANAGEMENT

Dr. Duncan Laxen
Air Quality Consultants

Air quality management is the application of a systematic approach to the control of air quality problems. The ultimate aim is to ensure the provision of good air quality so as to avoid the harm to health and the environment that can arise from air pollution. It can be applied at local, national or regional levels and involves several stages, summarised as follows:

- **Initial evaluation:** this is a preliminary assessment of the potential for air pollution to be a problem. It might take the form of an *air quality report* summarising what is known about air quality in a particular area.
- **Monitoring:** having identified the potential problems, it is often appropriate to develop a monitoring strategy to determine the true extent of the problem. A ‘problem’ is generally defined as non-compliance with an air quality criteria (eg an EC Directive or a WHO guideline).
- **Identification of sources:** if air quality is a problem, then the solutions require the sources to be identified. This can be done by preparing emission inventories. Air quality models can also be used to help identify the major contributors to the problem.
- **Identification of solutions:** once a clear picture has been developed of the causes of the air quality problem, a control strategy can be developed. Modelling is a useful tool to test the likely effectiveness of the range of strategies under consideration.
- **Implementation of solutions:** the options for implementing the solutions need to be clearly identified. These vary according to the nature of the problem and need to take account of legal, technical and financial constraints. A programme is then set up to implement the solutions.
- **Evaluation of effectiveness:** finally the effectiveness of the control programme is evaluated by continuation of the air quality monitoring.

To be most effective, air quality management should be applied at an appropriate scale. This scale can range from a valley with a single industrial plant, through a region the size of the West Midlands, to the whole of Europe. The appropriate scale will vary from pollutant to pollutant. Development of **air quality management plans** needs to take account of the most appropriate

CONTENTS

An Introduction to Local Air Quality Management -
Dr. Duncan Laxen

The Need for Local Air Quality Management -
Bernard Fisher

The Future of Air Quality Monitoring Networks -
Tim Brown

National Emissions Inventories -
Dr Simon Eggleston

Air Quality Management and Urban Nitrogen Dioxide Levels -
R. G. Derwent, T. A. McMullen

scale in order to provide the most cost-effective solutions. While air quality management for pollutants such as ozone is best vested in national governments, there are others for which there is value in developing more local solutions.

Local air quality management involves tailoring the activities of the monitoring, the inventories, the modelling and the control plans, to the nature of the locality and to the nature of the problem. Clearly local authorities operate at this local level, and they have an important role to play in implementing local air quality management. It is, however, important to recognise that air pollution transcends administrative boundaries and a single local authority may not always be the most appropriate body to apply local air quality management.

Many of the elements of local air quality management are already in use, although in a somewhat ad hoc way. The challenge is to find a means of applying a more systematic approach to local air quality management, thereby allowing resources to be targeted more effectively.

THE NEED FOR LOCAL AIR QUALITY MANAGEMENT

Bernard Fisher
TBV Science

The traditional approach to obtaining approval for a new source of air pollution, assuming 'best practice' was applied to the process, was

a) to undertake a dispersion calculation to predict ground-level concentrations using one of the commonly available dispersion models,

b) to obtain information on existing local air quality, usually from nearby monitoring sites, and

c) to compare levels with and without the new sources against air quality standards.

This approach is also commonly applied when seeking authorisation to operate existing processes. Provided that the new source makes a small incremental addition to air concentrations, and combined concentrations are well below air quality guidelines or standards, there is no difficulty with this approach.

In many situations the approach breaks down for the following reasons:

- existing air quality guidelines may be exceeded in the local area irrespective of the operation of the new source. The new source has the potential for worsening air quality but may be so small as to be largely irrelevant to existing air quality exceedances.

- exceedances may be associated with particular meteorological conditions. Some sources may be worse in one kind of weather condition and another source in another kind. It is difficult to combine the results from dispersion models applied separately to individual sources in a meaningful way.

- some regulated pollutants, such as nitrogen dioxide and ozone, are formed in the atmosphere, at rates dependent on factors not related to the new source such as the presence of other pollutants from sources, either inside or outside the area under consideration.

Air quality management is a complex, integrated approach which looks at the air quality issues of a locality as a whole to determine the best overall strategy. It has been applied in other parts of the world, such as to consider how to improve ozone concentrations in New York.

A particular example of a situation that might benefit from this approach is the current operation of Littlebrook Power Station on the eastern edge of London. Its and other industry's contribution to the concentrations of nitrogen oxides in the East Thames Corridor has been assessed in a recently published report by HMIP⁽¹⁾. This is the first report of its kind by HMIP to consider the combined effect of a number of industrial sources.

Emissions of nitrogen oxides from the power station are restricted well below highest possible emission rates. Generally winds will carry its NOx away from London. Monitoring at sites placed to try to identify the effect of the power station show that ambient NO_2 levels very rarely approach WHO guidelines.

Dispersion calculations for the power station show that in conditions favouring NO_2 formation over London (light easterly winds in convective conditions conducive to photochemical reactions) maximum ground-level concentrations would not exceed the WHO hourly NO_2 guideline or any other standard. These particular meteorological conditions arise about four hours per year. If these conditions occurred in combination with very high ozone levels and very high background concentrations of NO_2 from other sources within London, such as traffic and industry, then the combined concentration under unrestricted operation is predicted to exceed the guideline in some places. The technique of local air quality management could be used to determine whether the present restricted operation makes a useful contribution to improving the air quality in London.

Using local air quality management to make the optimum decision in this situation would require a detailed emission inventory for London and the South East, a description of the air flow over London under a range of meteorological conditions, a model of the dispersion and chemical transformation of pollution from each of the sources within London, measurements to describe the quality of air coming into the London area from outside and observations to test whether the model was a good description of the current pollution situation. This is a substantial task, but once completed has a wide range of possible applications.

The recent HMIP report[1] is a significant first step but air quality management would have to go further then the HMIP study by:

1. covering a wider area in and around London;

2. treating low-level sources such as traffic in more detail, especially establishing the frequency with which high concentrations from this source occurs and the local variability between roadside and urban background concentrations;

3. improving on the method for deriving NO_2 from NOx;

4. including all the industrial sources. A screening process was used to exclude some small sources from the analysis;

5. resolving in more detail the frequency of occurrence of the high concentrations of most interest;

6. testing the predictions of concentrations from current emissions against measurements to validate the model;

7. repeating the assessment for other pollutants besides NO_2.

1.HMIP, 1993. *An assessment of the effects of industrial releases of nitrogen oxides in the East Thames Corridor*, HMSO, ISBN 011 7528676.

VEHICLE EMISSIONS AND AIR QUALITY

One day symposium
Middlesex University, London
Monday 28 March 1994

Organised by
Middlesex University and NSCA
with the support of the
Department of the Environment

Details from NSCA

THE FUTURE OF AIR QUALITY MONITORING NETWORKS

Tim Brown
Information/Public Relations Officer, NSCA

In its response to the DOE consultation paper *The Future of Air Quality Monitoring Networks in the UK*, NSCA warmly welcomed the commitment to establish a coordinated approach to air quality monitoring in the UK. The paper makes some very sensible recommendations, but we are concerned that it fails to address the full implications of the forthcoming EC Air Quality Framework Directive which is likely to require a much more consistent approach to monitoring. In this paper local authority monitoring is treated as an optional add-on rather than the basis for building a coherent national network. Local authorities are still being invited to undertake monitoring, largely at their own expense, for the national benefit. Since air quality monitoring is not a statutory requirement we expect few local authorities to be able to justify the purchase of new equipment, even with central financial support for training, QA/QC procedures and telemetry.

A recent NSCA survey of local authority monitoring showed that very few have the resources to expand activities further. The current proposals would most likely result in piecemeal additions to the national network from those local authorities able to afford the necessary equipment. This would not reflect the actual *need* for monitoring, which should be based on data quality objectives derived from assessment of risks to health and the wider environment. The national strategy must be determined first, identifying priorities for air quality management area by area. Monitoring strategies can then be established as part of a coherent air quality management package. It will thus be possible to enter into partnership with the appropriate local authorities, and possibly some industrial groupings, to consolidate and enhance the network.

We acknowledge that limited resources are available to DOE, but regret that there is no new money on the table for actual monitoring. Whilst this is disappointing it is perhaps understandable in current financial circumstances. However it seems likely that the EC Framework Directive will demand a more coordinated approach to monitoring. This will require a reallocation of resources and possibly a statutory requirement for some local authorities to undertake monitoring.

Whilst welcoming the banding approach adopted by the paper, the terminology is confusing. Essentially the bands relate to the consistency of data quality rather than geographic distribution. The "National" Band accepts data from local automatic monitoring sites meeting national automatic site criteria. The "Regional" Band is really a local band contributing some useful supplementary data to the national picture, whilst "Local" Band is only suitable for local information. An improved terminology might be:

National Band
Local Class 1
Local Class 2

thus making a distinction between local monitoring which is (a) of national importance; (b) of some value beyond the locality and (c) of local interest only.

Some regional groupings (eg Manchester Area Pollution Advisory Council, Yorkshire and Humberside Pollution Advisory Council, etc) already pool data, and such coordination should be encouraged, but the data would not necessarily conform to the "Regional Band" criteria. On the other hand, regional coordination can encourage local authorities to enter monitoring at a QA/QC level appropriate to their resources and to progress to higher bands. It could also offer a consolidated approach to equipment purchase, calibration, site audits, data handling and the preparation of regional reports. Progress has recently been made in this respect by the London Air Quality Network.

The consultation paper represents a useful first step in this direction, but a coherent and cost-effective strategy has yet to emerge. We hope that the collaborative work on local air quality management currently being coordinated by the Society will contribute to building consensus on such a strategy.

This is an edited version of the NSCA's submission to DOE; copies of the full response are available free on request.

NATIONAL EMISSIONS INVENTORIES

Dr. Simon Eggleston
Warren Spring Laboratory

Inventories of emissions of atmospheric pollutants are an important part of any attempt to understand or control air pollution. Emissions inventories are compiled for different areas on a range of scales depending on the issue being considered. They can vary from a national total, important for a greenhouse gas such as carbon dioxide, to detailed spatial maps of emissions which are required to study urban air quality.

The National Atmospheric Emission Inventory (NAEI) is funded by the Department of Environment to compile emission inventories for the UK as a whole. The NAEI has developed methods for estimating emissions appropriate to the UK and these can be applied to urban inventories. An example is the recently compiled inventory of London. This estimates emissions of sulphur dioxide and nitrogen oxides across London with a resolution of one kilometre. This is suitable for input into modelling programs. This enables the main sources of pollution to be assessed and the effect of differing abatement options to be calculated.

AIR QUALITY MANAGEMENT AND URBAN NITROGEN DIOXIDE LEVELS

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Investment in pollution controls and new pollution-free technologies will provide secure and viable long term solutions to the problems of urban air quality and its deterioration. In the short term whilst these technologies penetrate into widespread usage, changes in our lifestyles and habits, in response to vigorous public information through air quality management, provides the only way forward to improved urban air quality. For air quality management to work successfully, we must be convinced that any actions that are taken will reduce air pollutant concentrations during episodes of poor air quality. Here we assemble the evidence that actions taken to reduce motor car use during adverse wintertime conditions will significantly reduce peak nitrogen dioxide levels.

The improvement in urban air quality during the 1960s and 1970s has been dramatic and smogs from domestic coal burning have been eliminated. During the 1980s and 1990s, the growth in motor vehicle traffic has begun to threaten urban air quality. On 13 December 1991, London experienced the most severe nitrogen dioxide pollution episode since regular monitoring began in 1971. Nitrogen dioxide (NO_2) is not the main oxide of nitrogen emitted into the atmosphere; the most prevalent is nitric oxide, (NO). Almost all of the NO_2 present in the urban atmosphere has been formed from NO by chemical reactions in the atmosphere. It is generally accepted that the oxidising capacity of the atmosphere is limited and hence the conversion of NO to NO_2. This has led to the view that a decrease in NO_x emissions, whether by fitting three-way catalysts or by air quality management, is unlikely to lead to an equal decrease in NO_2 concentrations or arguably any decrease at all in some urban areas. Should the urban atmosphere's limited capacity be completely exhausted, then it is possible that a reduction in NO_x emissions will not result in a decrease in NO_2 concentrations.

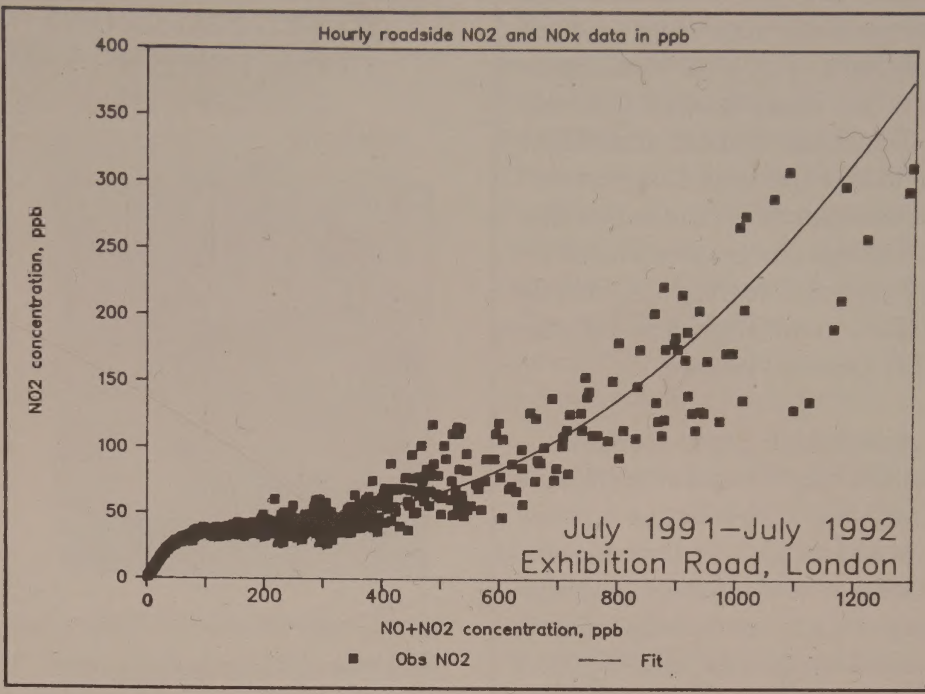

Figure 1. A plot of hourly mean NOx = NO + NO_2 concentration in ppb, horizontal axis, against hourly mean NO_2 concentration in ppb measured in Exhibition Road, London from July 1991 to July 1992.

These views have been expressed against the background of an incomplete understanding of the atmospheric chemistry involved in the conversion of the emitted NO to the more harmful NO_2. From an analysis of the December 1991 severe pollution episode in London, the observed time development of the seriously elevated NO_2 concentrations appears to be consistent with the second order reaction of nitric oxide with oxygen, an oxidant of unlimited supply, through:

$$NO + NO + O_2 = NO_2 + NO_2 \qquad (1)$$

In figure 1 we present the hourly mean NO_2 concentrations observed for a given hourly mean NO_x concentration for the 8000 hours or more during one year's continuous monitoring at a roadside site in Exhibition Road, London. The chosen year includes the serious wintertime NO_2 pollution episode described above and its influence is apparent in the elevated NO_2 and NO_x levels.

The response of the hourly mean NO_2 concentrations to changes in NO_x concentrations changes markedly across their observed range. At low NO_x concentrations, NO_2 concentrations rise quickly above zero then level out. In the level regime, despite large changes in NO_x concentrations, NO_2 concentrations remain unaffected, showing the limited oxidising capacity of the urban atmosphere. When referring to daily or annual mean NO_2 and NO_x concentrations, concentrations are necessarily in this low-NO_x regime. The above conclusions concerning the response of NO_2 concentrations to changes in NO_x emissions appear to be justified.

If attention is shifted to the high-NO_x regime, NO_2 concentrations rise quickly with increasing NO_x concentrations. This is most likely to be due to the second order nitric oxide reaction (1) above. A consequence of the steepening curve of NO_2 concentrations with increasing NO_x levels, is that episode peak NO_2 concentrations should decline dramatically with reducing NO_x emissions.

It is therefore possible to reconcile the apparently conflicting views that NO_x emission reductions will have both little impact and a significant impact on urban NO_2 concentrations. The first statement applies on the annual timescale, whereas the second applies on the hourly timescale during high pollution episodes. The latter conditions are far more relevant to urban air quality management. To reduce peak NO_2 concentrations such that none would exceed the 100 ppb threshold in the Department of the Environment "POOR" air quality bulletin category, a four fold reduction in NO_2 concentrations is required in London. On the basis of figure 1, this would be achieved by a two-fold (or 50%) reduction in NO_x emissions from low-level, mainly traffic, sources. This is because episode peak NO_2 concentrations appear to behave as if they are proportional to the square of the NO_x emissions.

The evidence appears therefore to be very strong that episode peak NO_2 concentrations should show a dramatic response to air quality management. There is every reason to believe that traffic management schemes, switching to public transport and temporary bans on vehicles without emission controls should bring a halt to urban air quality deterioration during adverse wintertime weather conditions.

The authors acknowledge the help they have received from Professor Roger Perry and Dr. John Lester of the Imperial College of Science and Technology and Medicine in providing the hourly NO and NO_2 data for Exhibition Road, London.

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NSCA 1994 SPRING WORKSHOP
LOCAL AIR QUALITY MANAGEMENT

- Towards a Practical Programme for the UK

Milton Hill House, Abingdon 13/14 April 1994

There is widespread agreement on the need to reduce air pollution to protect human health and conserve the environment. Air quality must be managed to meet local, national and international needs at least cost. To do this, it is necessary to identify the mix of measures which are most appropriate to local circumstances, and which also contribute to meeting national and international goals.

This workshop offers the opportunity to contribute to pioneering discussions which could lay the foundations for a management approach appropriate to the UK. We welcome the participation of all those with an interest in a rational approach to air quality management.

Fourteen invited speakers will review methods for characterising air quality and evaluate some of the options for managing air quality. The aim will be to establish general principles by discussion of practical experience, and to consider how these might be applied in the UK, with particular emphasis on the following areas:

- Air quality management: from concept to reality
- Air quality reports and action for improvement
- Monitoring
- Emission inventories
- Evaluation of data
- Meteorological aspects of air quality modelling
- Communicating air quality data and individual responses
- Control of air quality problems from industry and transport
- Air quality: the planner's perspective

The NSCA's annual Spring Workshop has established a reputation for bringing together UK opinion formers in relaxed and convivial surroundings. The aim is to provide an atmosphere which is conducive to informal discussion; attendance is limited to about 100. Participants in previous workshops have confirmed that the quality of information and interaction we are able to offer represents outstanding value for money.

The workshop will be held at the Milton Hill House Conference Centre, a Georgian manor house in the Oxfordshire countryside near Abingdon. The Centre has high quality conference facilities, and comfortable accommodation for those wishing to stay overnight.

The fee for the workshop including all meals and accommodation on Wednesday night is £195 for NSCA members, £255 non-members. Additional overnight accommodation before or after the workshop may also be arranged.

The fee without evening meal and overnight accommodation is £140 for NSCA members, £200 non-members. All workshop fees are subject to VAT. Full programme available from: NSCA, 136 North Street, Brighton, BN1 1RG. Tel: 0273 326313.

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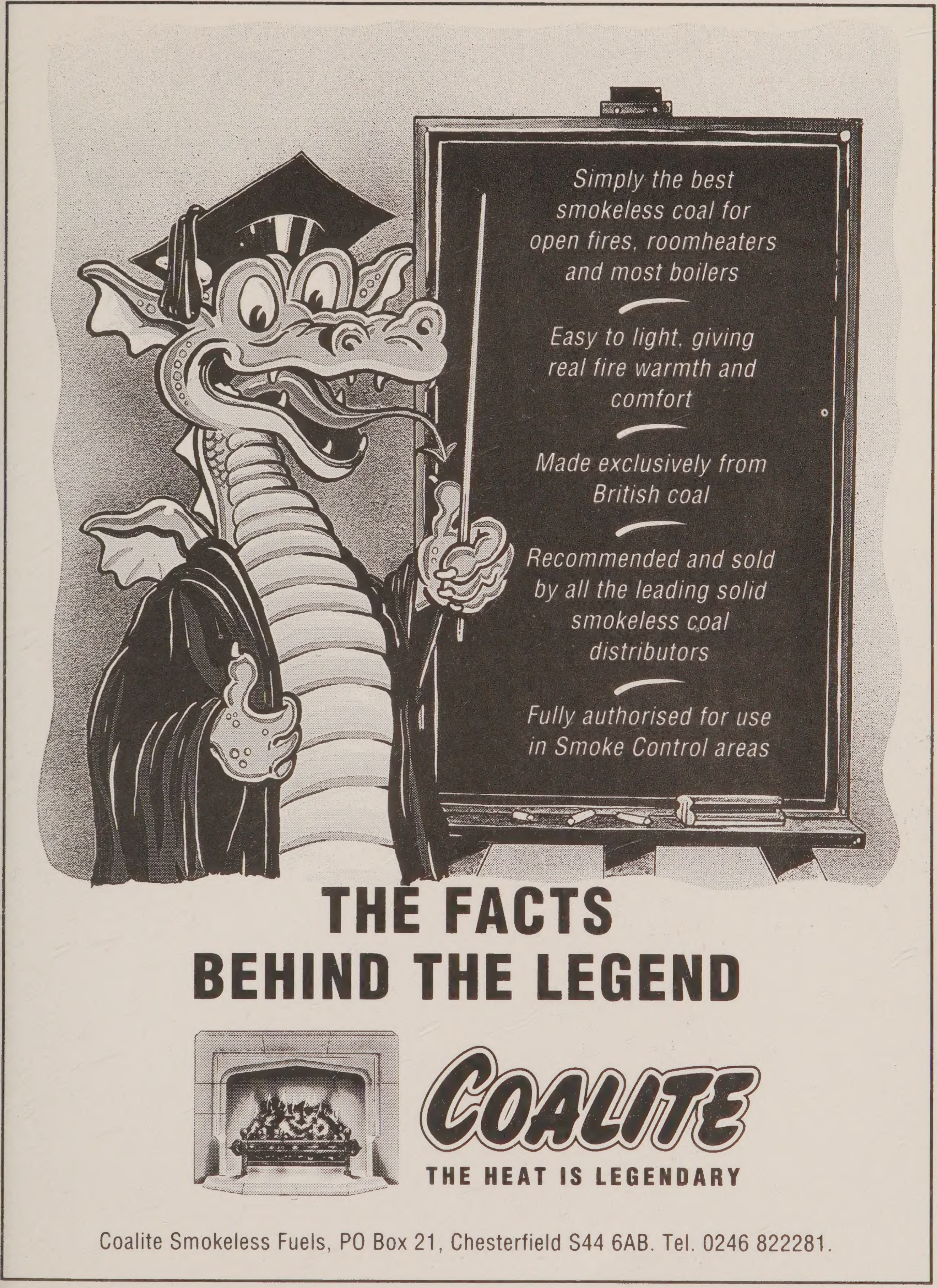

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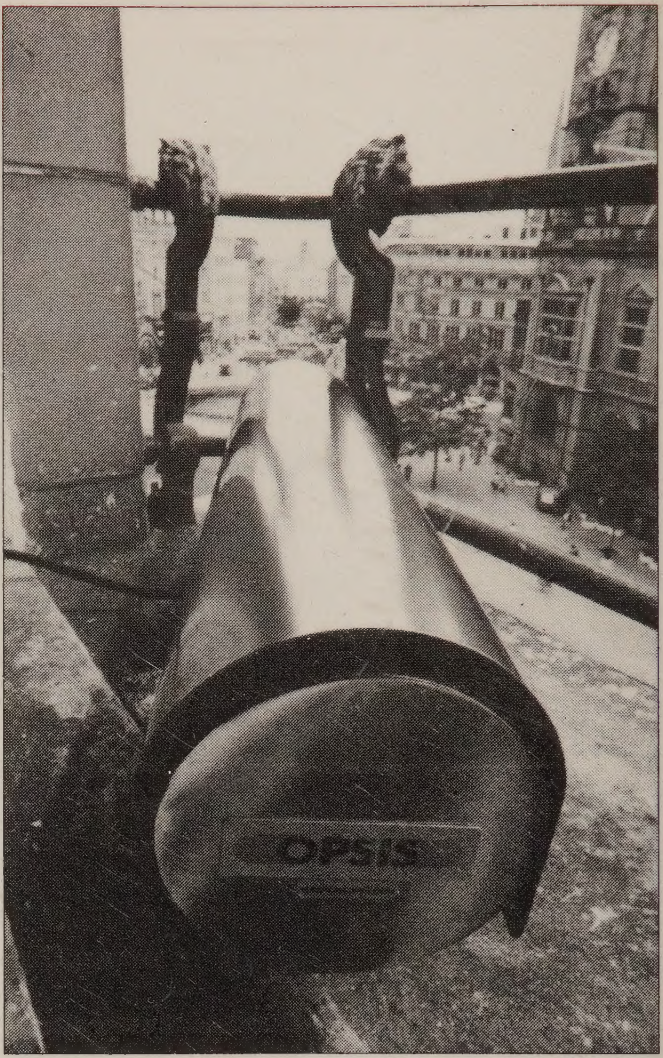

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